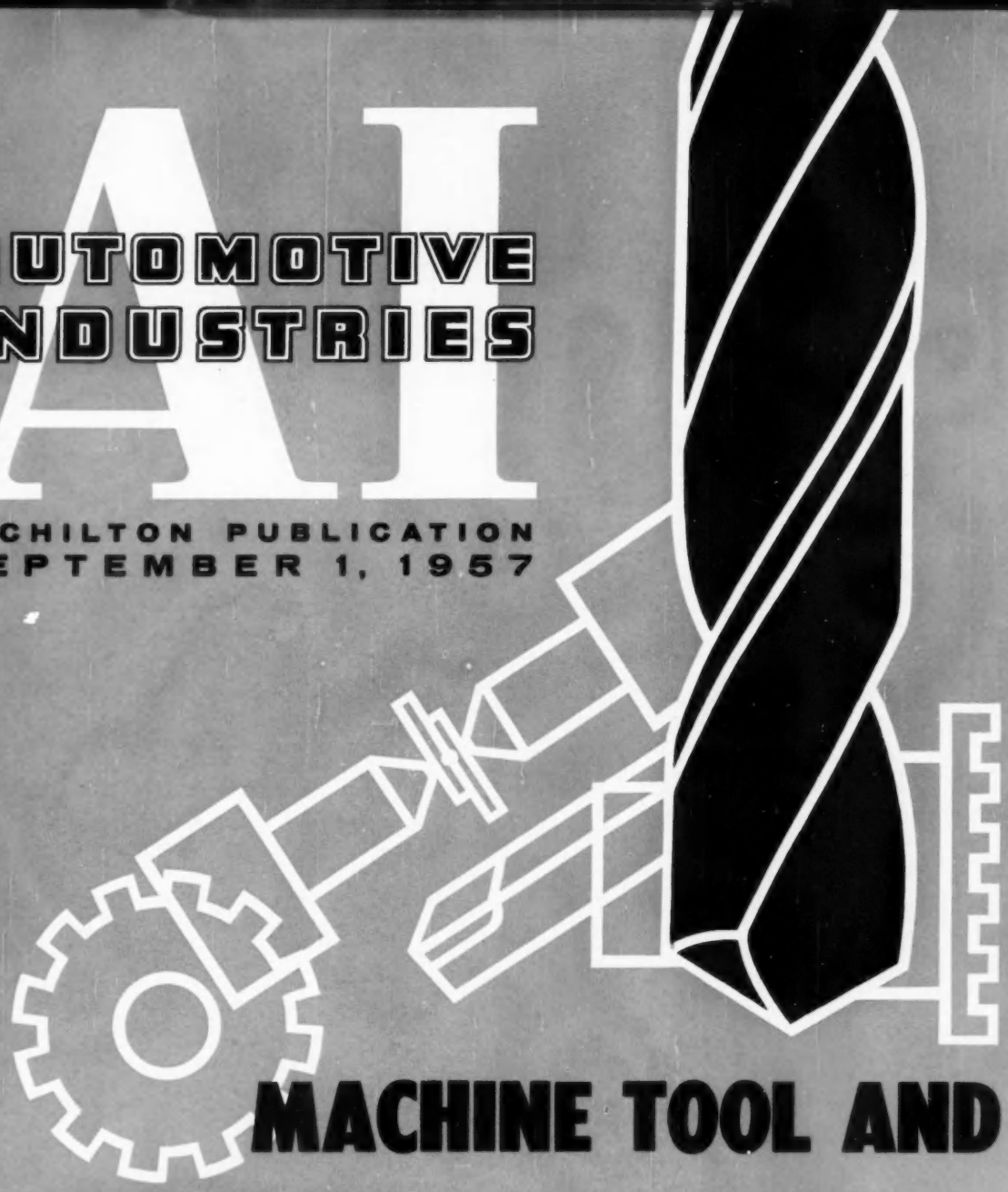
AUTOMOTIVE INDUSTRIES

A CHILTON PUBLICATION
SEPTEMBER 1, 1957



MACHINE TOOL AND PRODUCTION EQUIPMENT

SECTIONS

	PAGES
MACHINE TOOL	73-122
FORMING EQUIPMENT	123-136
PROCESSING EQUIPMENT	137-148
AUTOMATION AND MATERIAL HANDLING	149-156
QUALITY CONTROL EQUIPMENT	157-164
WELDING EQUIPMENT	165-170
SPECIALIZED EQUIPMENT	171-177

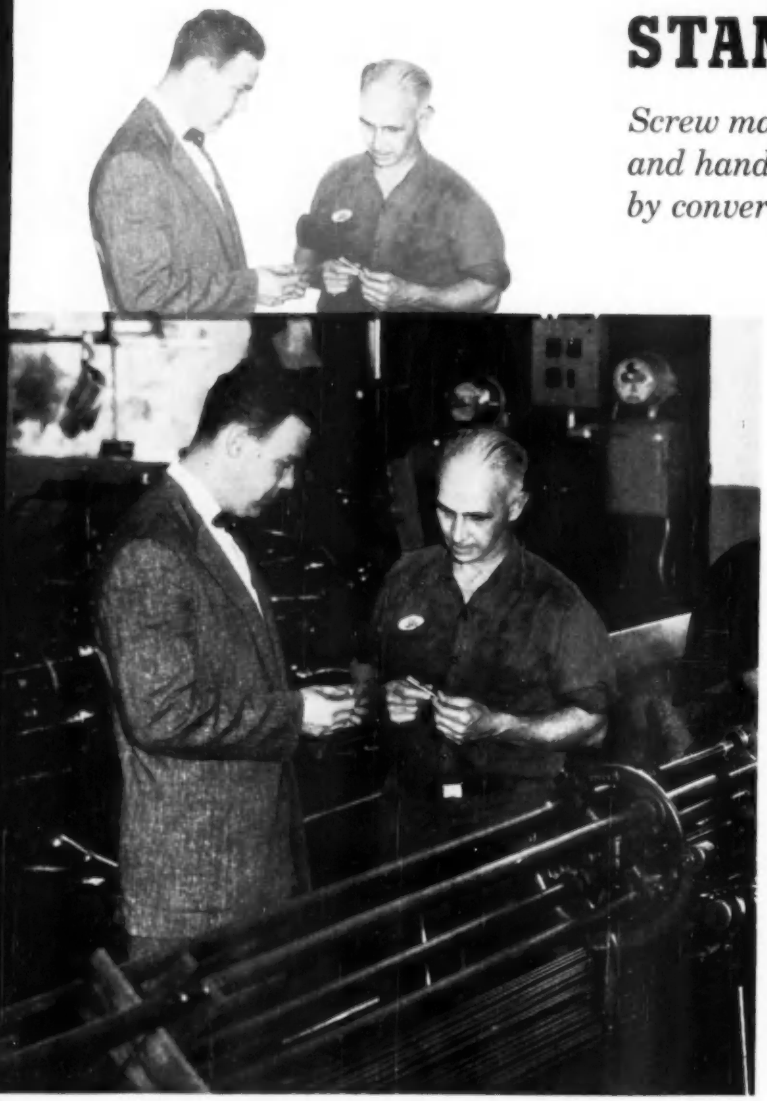
● Complete Table of Contents Page 3

ADDED FEATURE—THE NEW EDSEL

They cut out three oils by changing to one...

STANICUT Oil 166 BC

Screw machine plant saves on oil inventory and handling, receives other benefits by converting to dual-purpose cutting oil.



Standard Oil lubrication specialist Bob Cleland and plant manager I. G. Smallegan inspect machined piece. Giving technical help to customers like this is something for which Bob Cleland is well fitted. Bob has a mechanical engineering degree from Michigan State University and has completed the Standard Oil Company Sales Engineering School.

Grand Rapids Metal Products Company's problem was the mixing of cutting and lubricating oils in their National Acme and Gridley screw machines. In all, four oils were used. In some machines a cutting oil, two lubricating oils and a base oil were employed to improve machining characteristics. Lubricating oil leaking past seals mixed with the cutting oil, reducing cutting oil qualities. Oil mixtures were constantly varying, and troubles in tapping resulted.

Standard Oil's Bob Cleland, working with plant management, suggested STANICUT Oil 166 BC. This oil, he explained, is a dual-purpose oil. It can be used for lubrication as well as for cutting. In such applications, no dilution of the cutting oil can occur.

After a week's trial in one machine, the entire plant was converted to STANICUT Oil 166 BC. Tap troubles were reduced, resulting in much less down time. Spindle speeds have been increased, yet the spindles run cool. Four oils were formerly kept in stock. Now only one is needed.

STANICUT Oil 166 BC does not corrode bearings, gears, bushings, spindles or other machine parts. While the oil contains E.P. additives, it does not stain copper or brass.

Get the facts on how STANICUT Oil 166 BC can help you. Call the Standard Oil office nearest you anywhere in 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Quick facts about
STANICUT OIL 166 BC

1	A dual-purpose oil — suitable for both cutting and lubrication.
2	Non-corrosive to work or machines.
3	Formulated with E.P. additives.
4	Stable under all normal conditions.
5	Non-irritating.
6	A cutting oil that permits high operating speeds.
7	Non-staining to either copper or brass.

STANDARD

STANDARD OIL COMPANY
(Indiana)

specializing only in drill jig bushings



American SPECIALIZES — that's the reason you get BLUE CHIP service when it comes to drill jig bushings. For instance, American's exclusive distributors can immediately fill every A. S. A. requirement —and more than 50 per cent of what are usually considered "specials" right off the shelf. Specializing also means you buy the finest drill jig bushings when you buy AMERICAN!

American DRILL BUSHING CO.

5107 Pacific Blvd. • Los Angeles 58, Calif.

SEND FOR FREE COPIES OF OUR NEW CATALOGS



Truck body weight cut 25% thanks to strength of Nickel-Copper alloy steel

Truck bodies in the three fleets above are high strength low alloy nickel-copper steel.*

With this nickel-containing structural material, Boyertown Auto Body Works, Inc. are able to give their customers strong, corrosion-resistant truck bodies that average 25 to 40% lighter than the same size bodies made of carbon steel.

You can do the same.

High strength low alloy Ni-Cu steels provide more strength per pound . . . per dollar.

These steels show a minimum yield strength of 50,000 pounds per square inch . . . about 1½ times that of carbon steel. This means you can trim deadweight substantially without sacrificing strength, safety or service life.

High strength low alloy nickel-copper steels also provide 4 to 6 times greater resistance to atmospheric corrosion than do carbon steels. They resist shock, battering and abrasion too. And they can be readily formed and welded.

The 48-page Inco booklet *Nickel-Copper High Strength Low Alloy Steels* discusses compositions of these versatile alloys, their properties, design factors, fabrication . . . illustrates scores of applications. Let us send you a copy.

**High strength low alloy Nickel-Copper steels which meet the requirements of SAE specification 950 are marketed under various trade names by leading steel companies. Names supplied on request.*

The International Nickel Company, Inc.

67 Wall St. INCO TRADE MARK New York 5, N. Y.

INCO NICKEL

AUTOMOTIVE INDUSTRIES

A CHILTON MAGAZINE — PUBLISHED SEMI-MONTHLY

SEPTEMBER 1, 1957 — VOL. 117, NO. 5

MACHINE TOOL AND PRODUCTION EQUIPMENT SECTIONS

MACHINE TOOL SECTION 73
FORMING EQUIPMENT SECTION 123
PROCESSING EQUIPMENT SECTION 137
AUTOMATION, MATERIAL HANDLING SECTION 149
QUALITY CONTROL EQUIPMENT SECTION 157
WELDING EQUIPMENT SECTION 165
SPECIALIZED EQUIPMENT SECTION 171

FEATURES

The Edsel—America's Newest Car..... 66
Trends in the Construction Equipment Industry. *By Kenneth Rose*..... 196

NEWS PREVIEWS

Edsel Makes Public Bow September 4..... 55
All-Synthetic Truck Tire is Developed 55
Air Suspension's Use Brighter for Trucks 56
Allis-Chalmers Research Facility 57
AMC Using New Paint Technique 58
Mack Arranges $136 Million Credit 58
New Twin Disc Laboratory 59
Pratt & Whitney Offers Credit Plan 60
Westinghouse Reports Record Sales..... 61
Ford Gets Contract for Truck Engineering 62
Minnesota Mining Sales Total $181 Million 62

DEPARTMENTS

Calendar of Coming Events 28
High Spots of This Issue 53
News of the Automotive and Aviation Industries 55
Industry Statistics 63
Men in the News 64
Machinery News. *By Charles A. Weinert* 178
Automation News Report. *By Samuel Cummings*.. 182
Free Literature and Free Information Service... 183
Metals. *By William F. Boericke* 186
On Our Washington Wire..... 190
Shorties 192

Business Department Staff 53
Chilton Officers and Directors 53
Advertisers' Index 244

EDITORIAL STAFF

JAMES R. CUSTER, Editor
H. H. ROBERTS, Engineering Editor
ANDREW SHEARER, Market Research Editor
ROBERT P. HOMER, Editorial Production Mgr.
MARCUS AINSWORTH, Statistical Editor
SAMUEL CUMMINGS, News Editor
DIANE DAVIS, Art Editor
HOWARD KOHLBRENNER, Art Director

DETROIT
Joseph Geschelin, Detroit Editor
Hugh C. Quinn, Detroit News Editor

PHILADELPHIA & NEW YORK
CHARLES A. WEINERT, Eastern Editor

WASHINGTON
George H. Baker, Washington Editor
Ray M. Stroupe, Wash. News Editor
Neil R. Regeimbal, Wash. News Editor

CHICAGO
Kenneth Rose, Mid-West Editor

LOS ANGELES
R. Raymond Kay, Pacific Coast Editor

BERN
Robert S. Braunschweig, European Correspondent

LONDON
David Scott, British Correspondent

Paul Wooton, Washington Member, Editorial Board

As part of its worldwide automotive and aviation news coverage, AUTOMOTIVE INDUSTRIES is serviced by International News Service and has editorial correspondents in major United States and Foreign industrial centers

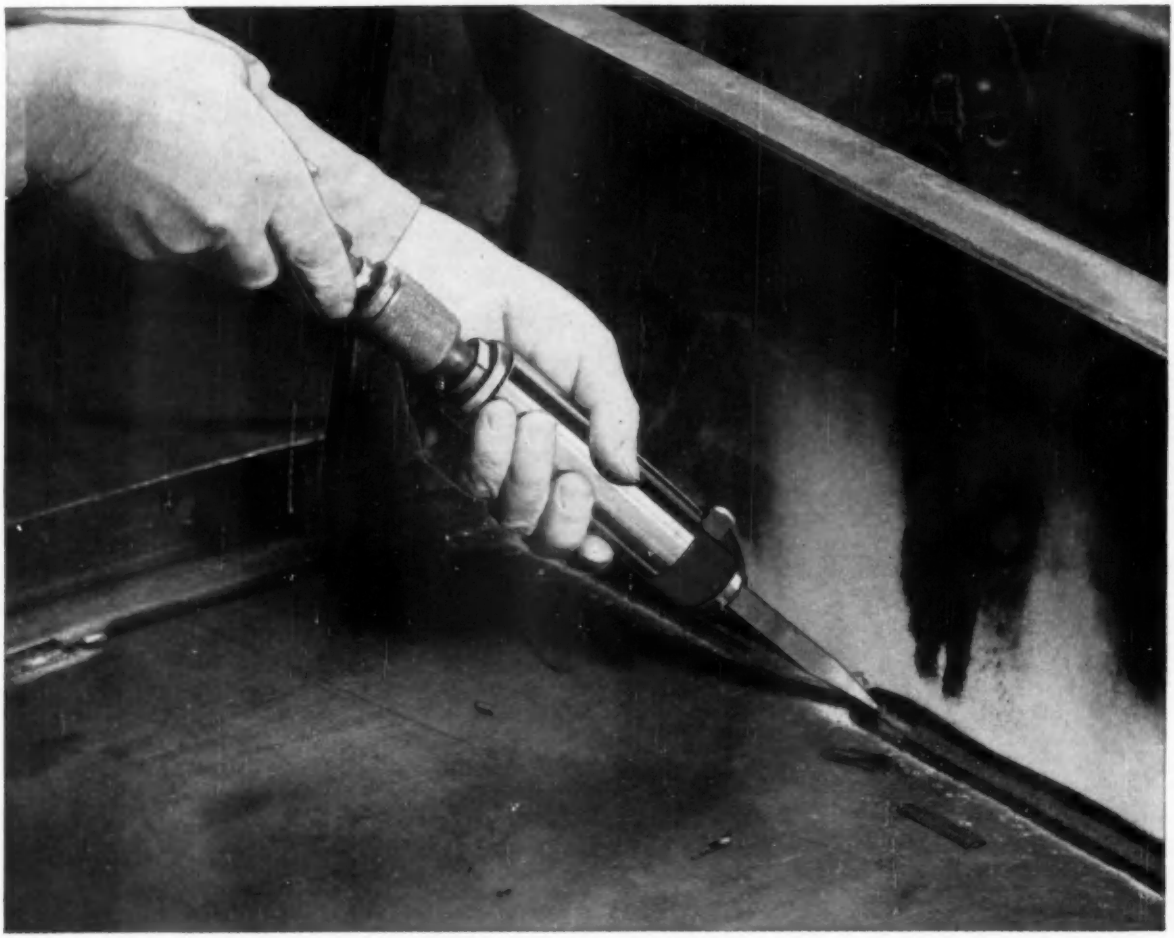
MEMBER — Society of Business Magazine Editors — National Business Publications, Inc. — Audit Bureau of Circulations

Copyright 1957 by Chilton Company (Inc.)

AUTOMOTIVE INDUSTRIES is a consolidation of The Automobile (weekly) and the Motor Review (weekly) May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

EDITORIAL EXECUTIVE OFFICES, Chestnut and 56th Sts., Philadelphia 39, Pa., U. S. A. Cable address—Autoland, Philadelphia.

AUTOMOTIVE INDUSTRIES. Published semi-monthly by Chilton Co., Chestnut & 56th Sts., Phila. 39. Entered as Second Class Matter October 1, 1925, at the Post Office at Philadelphia, Pa.; Under the Act of Congress of March 3, 1879. In case of Non-Delivery Return Postage Guaranteed. Subscription price: To manufacturers in and suppliers to the automotive industries in the United States and Possessions, $2.00 per year; $3.00 for 2 years. All Others, $10.00 per year. Single copies, 50¢. Statistical Issue, $1.00.



Cuts scaling time 60%

JOB: Removing welding flash on fabricated parts. Formerly used heavier, slower welding hammer and pick. Switched to rugged, fast-hitting Rotor S-1P Scaling Hammer.

RESULT: Reduced scaling time from 75 minutes to 30 minutes. Savings paid for new scaler in 60 working days.

Rotor S-1P is also ideal for peening, paint scaling, beveling of plates, light chipping and star drilling. Front exhaust keeps work clean. Push-throttle permits operator to rotate tool and chisel . . . start with a few blows and control blows up to 5000 a minute. Safety chisel retainer allows one-hand operation. Chisel bushing is replaceable. Available with three throttle handles: Push (S-1P), Lever (S-1L), Grip (S-1G).

Full details in Bulletin 54 . . . or ask for demonstration on *your* job. The ROTOR TOOL Company, Cleveland 32, Ohio.

Here's the RIGHT TOOL for YOUR job!

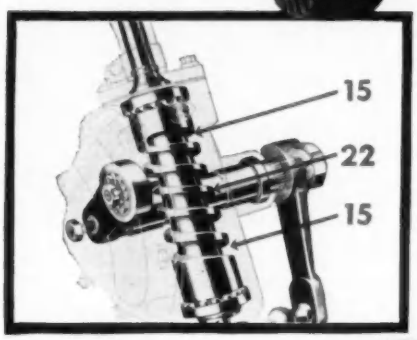


Rotor Air Tools: Assembly Tools • Drills • Small Wheel Grinders Straight Grinders • Vertical Grinders • Scalers • Chippers • Rammers
Rotor High-Cycle Electric Tools: Grinders • Polishers • Sanders

ROTOR TOOLS®
CLEVELAND, OHIO

Ross VARIABLE-RATIO STEERING FOR SPORTS CARS





▶ **What's the advantage** of *variable-ratio* steering for sports cars? For example . . . 15:22:15?

▶ **Simply stated,** variable-ratio provides faster steering and quicker recovery for cornering, and slower steering and greater stability for high-speed, straight-ahead driving.

▶ **Variable-ratio** is an exclusive feature of *Ross Cam & Lever Steering.* No other type of steering gear provides it.

▶ **Another inherent quality** of Ross steering, that pleases drivers and helps make heavier vehicles handle like a sports car is "road sense" . . . a light, responsive touch, a feel of the road at all times.

▶ **Ross invites** discussion of any steering problem: variable or fixed ratio, manual or power.

ROSS GEAR & TOOL COMPANY, INC. • LAFAYETTE, INDIANA
Gemmer Division • Detroit

Ross STEERING

Up to 40% higher tightening torques keep a

—and only the combination of an UNBRAKO screw

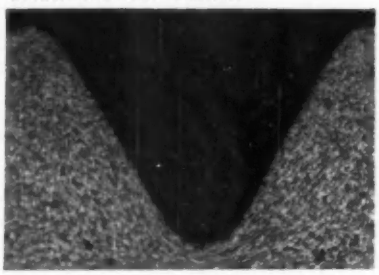
RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

SCREW SIZE	UNBRAKO	SET SCREW B	SET SCREW C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

The High-Torque UNBRAKO socket set screw is made to withstand the highest tightening torques ever used to seat a set screw—up to 40% higher than an ordinary set screw. But to take full advantage of this UNBRAKO feature you must have a key that can apply the force required to seat it without damaging the screw or snapping the key. The High-Titan UNBRAKO hex key is designed specifically to set a High-Torque UNBRAKO so that you can be assured of full *high-torque* performance every time.

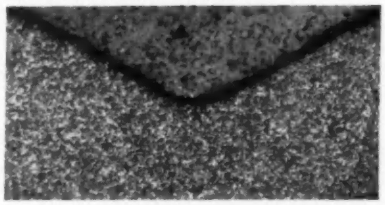
Here's why a High-Torque UNBRAKO can be seated tighter—and stay put

UNBRAKO SET SCREW



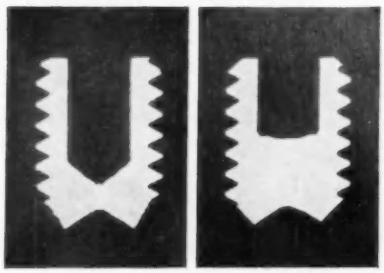
It has fully formed threads that make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see in this illustration. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur. The UNBRAKO retains its flow lines even when ground down to .010 in. below root diameter. Screws with cut or ground threads lose thread form at root diameter.

UNBRAKO SET SCREW



The High-Torque UNBRAKO has a radius in the socket corners. This eliminates the sharp corners where cracks start. It also distributes the stresses developed when tightening torques are applied. Ordinary socket screws have sharp corners which often crack when tightened even at lower torques than those recommended for UNBRAKO.

UNBRAKO SET SCREW **ORDINARY SET SCREW**



The High-Torque UNBRAKO has a deeper socket, which gives you more purchase with the wrench. Since more wrench can be put into the UNBRAKO socket, you can set the screw much tighter. And you won't ream the socket or round the corners of the wrench.

UNBRAKO SET SCREW

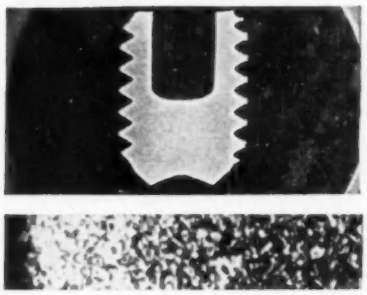


The High-Torque UNBRAKO is properly heat treated, kept clean. Its grain structure is uniform. It is free of decarburization. There's no danger of stripping the threads or shearing the point when tightening

High-Torque UNBRAKO socket set screw tight

and key assures full *high-torque* performance

ORDINARY SET SCREW



torques are applied. The ordinary screw is suffering from an overdose of decarburization; socket walls, threads and point are full of the telltale white spots that identify it.

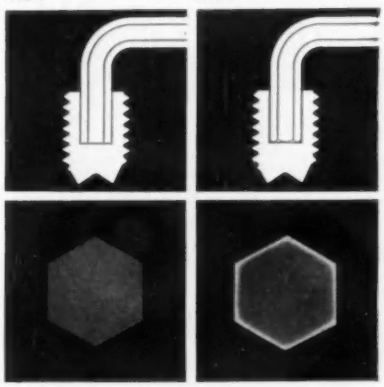
And here's why an UNBRAKO High-Titan hex key can be used to apply far more tightening torque to a High-Torque UNBRAKO socket set screw than is needed without damaging either the screw or the key.

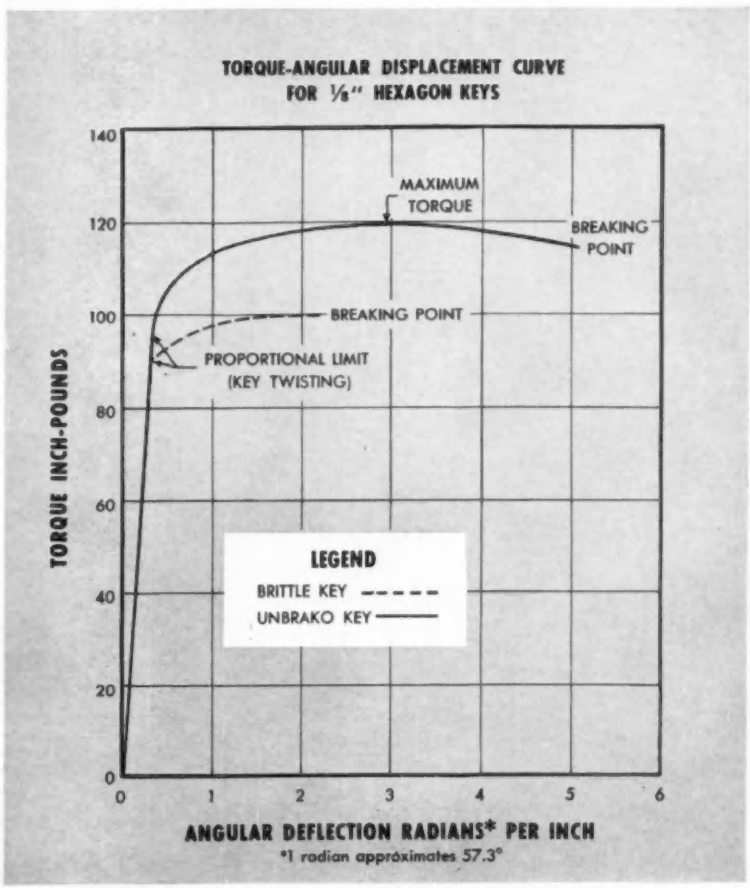
The High-Titan UNBRAKO is not an ordinary hex key. It is a precision internal wrenching tool with high ductility, specially designed to assure full high-torque performance. It is made of special alloy steel bar stock, inspected magnetically and chemically to make sure that the material is flawless and of the specified properties.

Its sides are flat and parallel. The corners, which exert torque on the inner walls of the socket, are sharp and tough. The bend is strong.

The High-Titan UNBRAKO is accurately sized across the flats and across the corners to insure snug fit and full wall contact. It won't ream or wear an UNBRAKO socket. The square cut end engages the full depth of the socket for greater tightening power. It gives you up to 25% more wrench engagement than a key with a chamfered end.

UNBRAKO KEY **CHAMFERED END KEY**





The High-Titan UNBRAKO hex key is heat treated in modern atmosphere-controlled furnaces. The surface is casehardened without decarburization. The extra hard surface gives the key longer life. And it retains its dimensional accuracy, is tougher and more ductile than ordinary keys. This torque-angular displacement curve for 1/8 in. hexagon keys distinguishes a High-Titan UNBRAKO from an ordinary key. The High-Titan UNBRAKO has a higher yield point and a higher breaking point—you can exert a much higher torque with it without snapping the key.

Be sure you get the full high-torque performance offered only by the combination of a High-Torque UNBRAKO socket set screw and a High-Titan UNBRAKO hex key. Both products are stocked by authorized industrial distributors. Ask the one nearest you for complete information. Or write STANDARD PRESSED STEEL CO., Jenkintown 53, Pa.

We also manufacture precision titanium fasteners. Write for free booklet.

Unbrako Socket Screw Division **SPS** **Jenkintown, Pennsylvania**

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Cooper Precision Products • Standco Canada, Ltd. • Unbrako Socket Screw Co., Ltd.

There's an AJAX FORGING MACHINE . . .

— For Every Field of Upset Forging in Industry —

BUILT IN TWELVE SIZES 1" to 12"

Choose from a complete line of AJAX Forging Machines to make the forged parts you need—

AUTOMOTIVE — Transmission Gears—Flanged Axle Shafts—Crankshaft Flanges & Drag Links

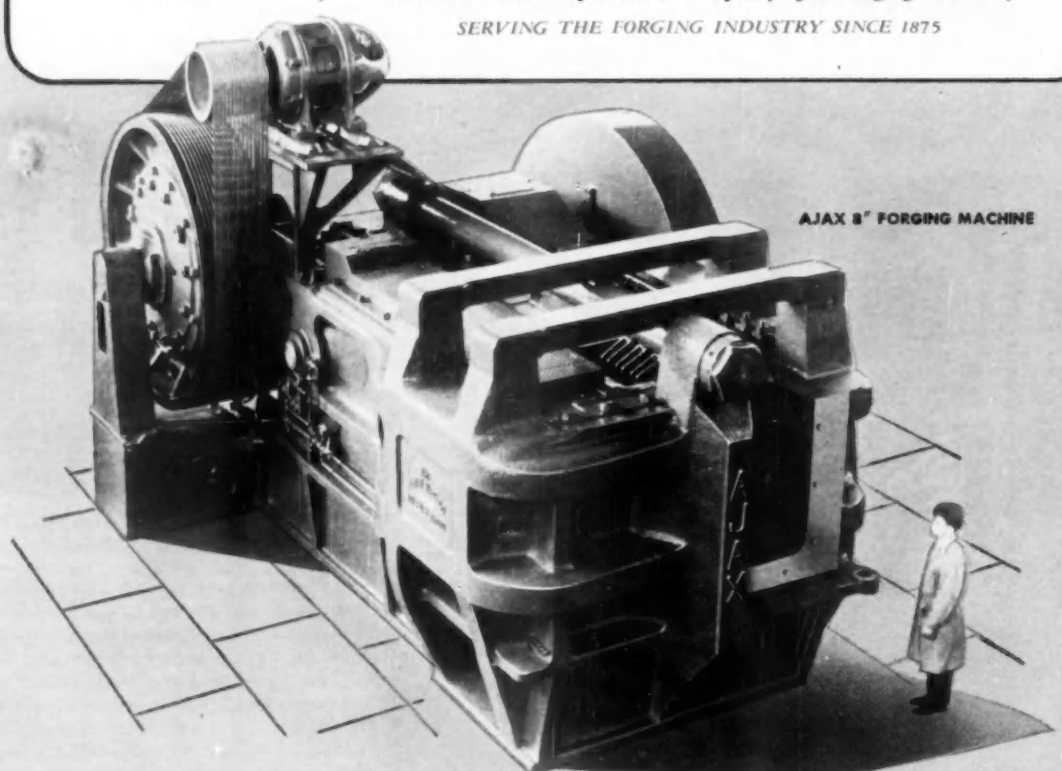
AIRCRAFT—Cylinder Heads & Jet Blade Blanks

AGRICULTURAL—Implement & Tractor Forgings

RAILROAD—Freight Car Brake Levers—Grab Irons & Brackets

For Higher Production and more accurately Forged Parts—Specify AJAX Forging Machinery

SERVING THE FORGING INDUSTRY SINCE 1875



AJAX 8" FORGING MACHINE



AJAX METAL WORKING MACHINES

FORGING PRESSES — FORGING MACHINES — FORGING ROLLS — AJAX-HOGUE WIRE DRAWERS

THE AJAX MANUFACTURING COMPANY . . . . . CLEVELAND 17, OHIO

CHICAGO OFFICE: 110 S. DEARBORN ST., CHICAGO 3, ILLINOIS

W. P. WOOLDRIDGE CO. • BURLINGAME, CAL. • LOS ANGELES 22, CAL.

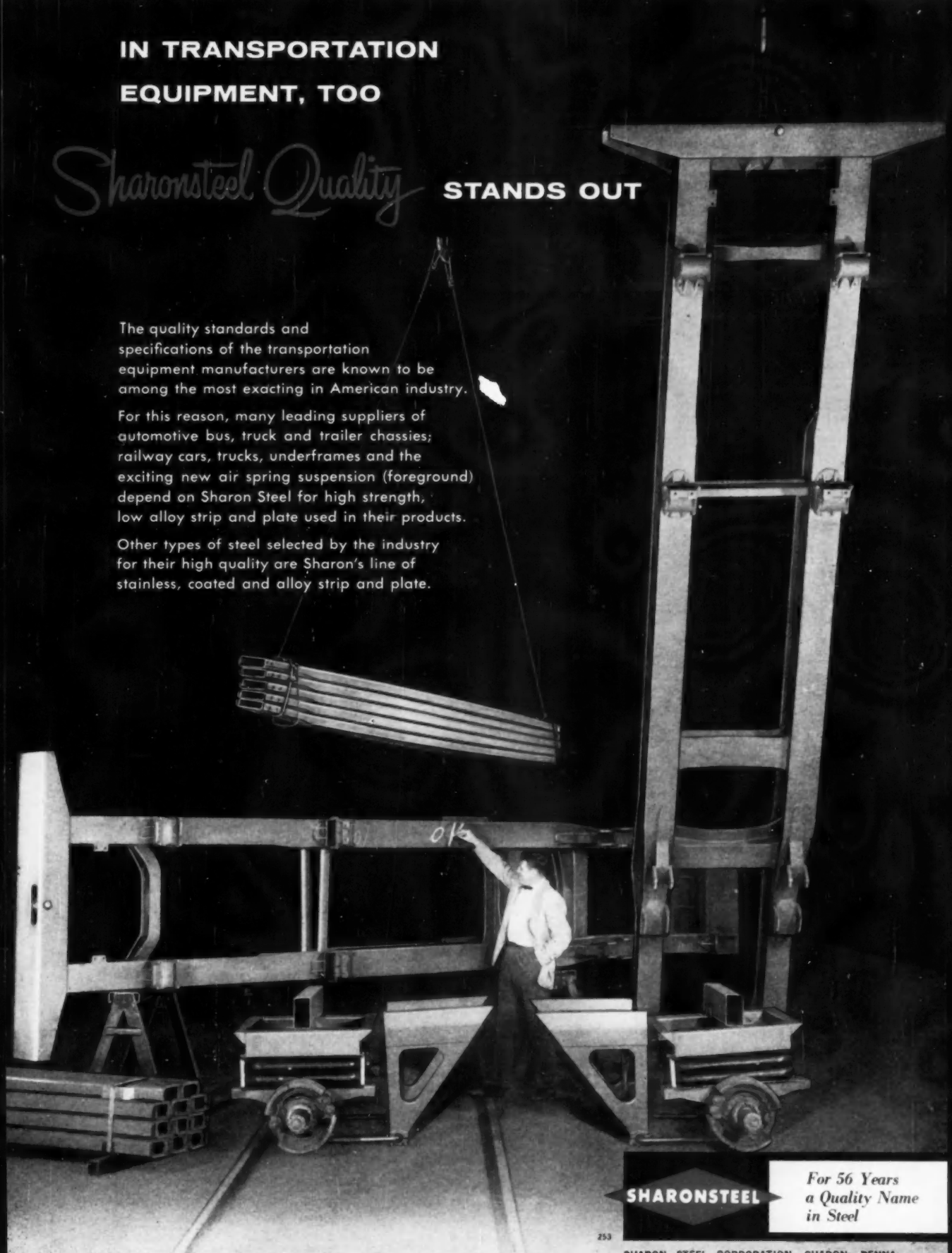
IN TRANSPORTATION EQUIPMENT, TOO

Sharonsteel Quality STANDS OUT

The quality standards and specifications of the transportation equipment manufacturers are known to be among the most exacting in American industry.

For this reason, many leading suppliers of automotive bus, truck and trailer chassies; railway cars, trucks, underframes and the exciting new air spring suspension (foreground) depend on Sharon Steel for high strength, low alloy strip and plate used in their products.

Other types of steel selected by the industry for their high quality are Sharon's line of stainless, coated and alloy strip and plate.



SHARONSTEEL

For 56 Years a Quality Name in Steel

253

SHARON STEEL CORPORATION, SHARON, PENNA.

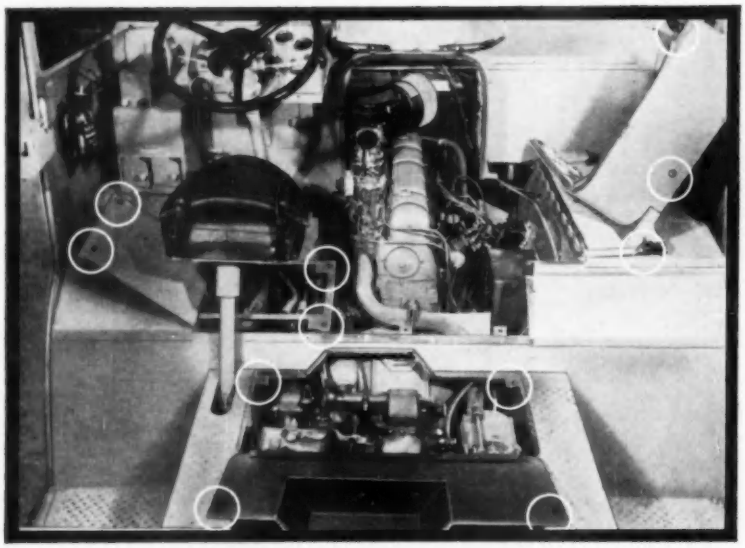
CHICAGO, CINCINNATI, CLEVELAND, DAYTON, DETROIT, GRAND RAPIDS, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, NEW YORK, PHILADELPHIA, ROCHESTER, SAN FRANCISCO, SHARON, MONTREAL, TORONTO

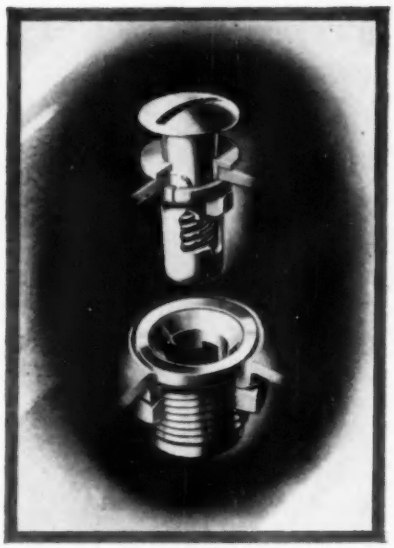
Design problem:

Fastening of removable panels

Your best answer:

Economical, easy-to-install QUICK-LOCK





Photograph courtesy Divco-Wayne Corporation, Detroit, Michigan

In Divco delivery trucks,

QUICK-LOCK guarantees

trouble-free opening and closing

of cowlings and access panels

Among the outstanding design features which have contributed to the success of Divco door-to-door delivery vehicles is the sure, quick closing and opening of cowlings and panels. To provide easy access to engine and transmission, Divco specifies Simmons QUICK-LOCK on demountable covers of various shapes and thicknesses.

QUICK-LOCK has unlimited applications in the electrical and electronic, automotive, appliance, aircraft, and other manufacturing fields. *Here's why* millions are in use today on many types of valuable equipment cases, weather-tight lighting units, voltage regulators, engine panels, and access panels and doors:

- A 90-deg. turn locks and unlocks QUICK-LOCK. No special tools needed.
- Stud is self-aligning; speeds up mounting and demounting of removable panels.
- When unlocked, stud is self-ejecting—easily checked by visual inspection.
- Various stud and receptacle types...oval, flush, and wing-head studs; easily installed plate and screw-type receptacles.
- Helical spring in stud supports initial load; solid stud part holds increased load.
- Design features allow for curved sheet installation, and even slight misalignment of holes.
- *Maximum economy in production* assured by single hole mounting of screw-type receptacle.

Send today for the Simmons Catalog

Where does QUICK-LOCK belong in your design? For complete information and specifications, write for the Simmons Catalog today. Samples and free engineering service are available upon request.

SIMMONS

FASTENER CORPORATION

1749 North Broadway, Albany 1, New York

QUICK-LOCK • SPRING-LOCK • ROTO-LOCK • LINK-LOCK • DUAL-LOCK

WEBSTER'S NEW PILOT OPERATED RELIEF VALVE



Compact design adapts to "tight" installations. Adjustable from 500 to 2000 psi. Maximum capacity, 20 gpm.

BOOSTS WORK OUTPUT 38.5%!

call the man from Webster



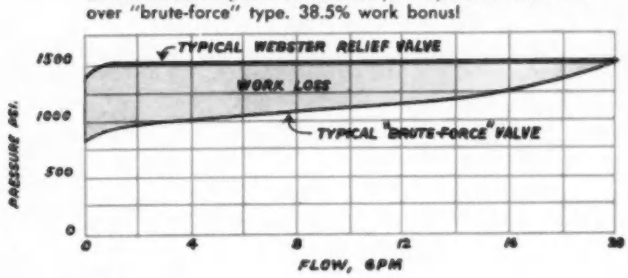
His intimate knowledge of this new relief valve — its many benefits and applications — can help in adapting it to your product.

Full speed power up to 93% of relief setting is now possible with this new Webster pilot operated relief valve. Result: 38.5% work bonus over "brute-force" type valves! More, you get all the benefits of clog-free performance, quieter operation...lower price. Mighty sound reasons for specifying Webster's pilot operated relief valve *now*.

OIL HYDRAULICS DIVISION

WEBSTER ELECTRIC
MELROSE 3-3511
RACINE · WIS

Typical performance curve shows minimum pressure drop and instantaneous response of Webster pilot operated relief valve over "brute-force" type. 38.5% work bonus!





☐ *Have THE MAN FROM WEBSTER contact us—*

—Please send the following:

☐ *Bulletin H3A2 covering the new Webster pilot operated relief valve*

☐ *Complete hydraulic catalog of pumps, valves and fluid motors*

☐ *New information or data as published*

Name_____

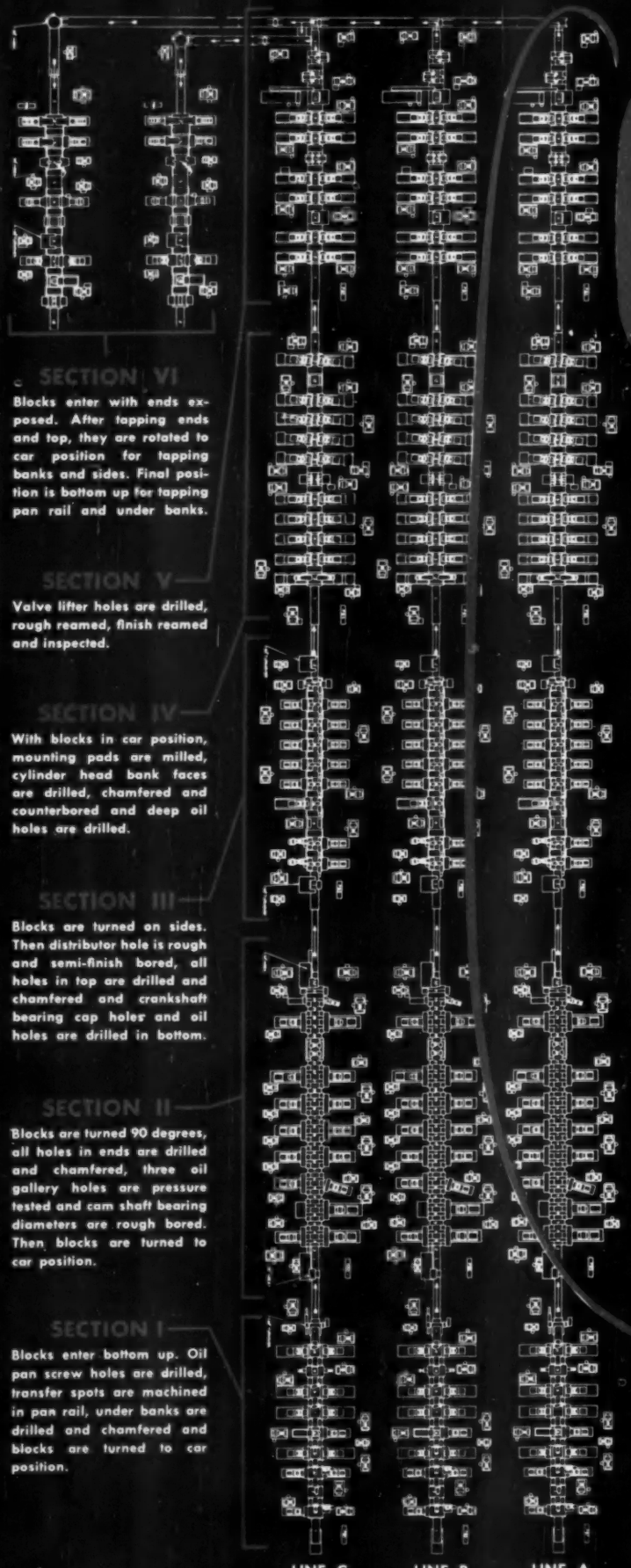
Title_____

Company_____

City_____ State_____

franklin adv. H104

1300 ft. Transfer-matic Performs 2291 Operations on V-8 Blocks



SECTION VI

Blocks enter with ends exposed. After tapping ends and top, they are rotated to car position for tapping banks and sides. Final position is bottom up for tapping pan rail and under banks.

SECTION V

Valve lifter holes are drilled, rough reamed, finish reamed and inspected.

SECTION IV

With blocks in car position, mounting pads are milled, cylinder head bank faces are drilled, chamfered and counterbored and deep oil holes are drilled.

SECTION III

Blocks are turned on sides. Then distributor hole is rough and semi-finish bored, all holes in top are drilled and chamfered and crankshaft bearing cap holes and oil holes are drilled in bottom.

SECTION II

Blocks are turned 90 degrees, all holes in ends are drilled and chamfered, three oil gallery holes are pressure tested and cam shaft bearing diameters are rough bored. Then blocks are turned to car position.

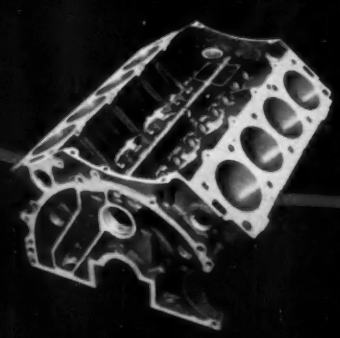
SECTION I

Blocks enter bottom up. Oil pan screw holes are drilled, transfer spots are machined in pan rail, under banks are drilled and chamfered and blocks are turned to car position.

LINE C LINE B LINE A

Here is the answer to the automobile industry's insistent request for machine tools which will reduce the cost of model changes and shorten change-over periods. This giant "Sectionized" Transfer-matic is constructed with an entirely new set of Cross building blocks and applies new concepts of standardization to machine bases, transfers, fixtures and heads.

- ★ Capacity to machine any passenger car engine block.
- ★ 270 stations in 17 sections, each with independent controls; sections operate automatically as blocks are made available; any section may be stopped without interrupting production of others.
- ★ 2291 operations on 185 blocks simultaneously.
- ★ Rated capacity of 350 cylinder blocks per hour.
- ★ Cross Machine Control Units with Toolometers for efficient tool programming.
- ★ Pre-set tools to reduce downtime.



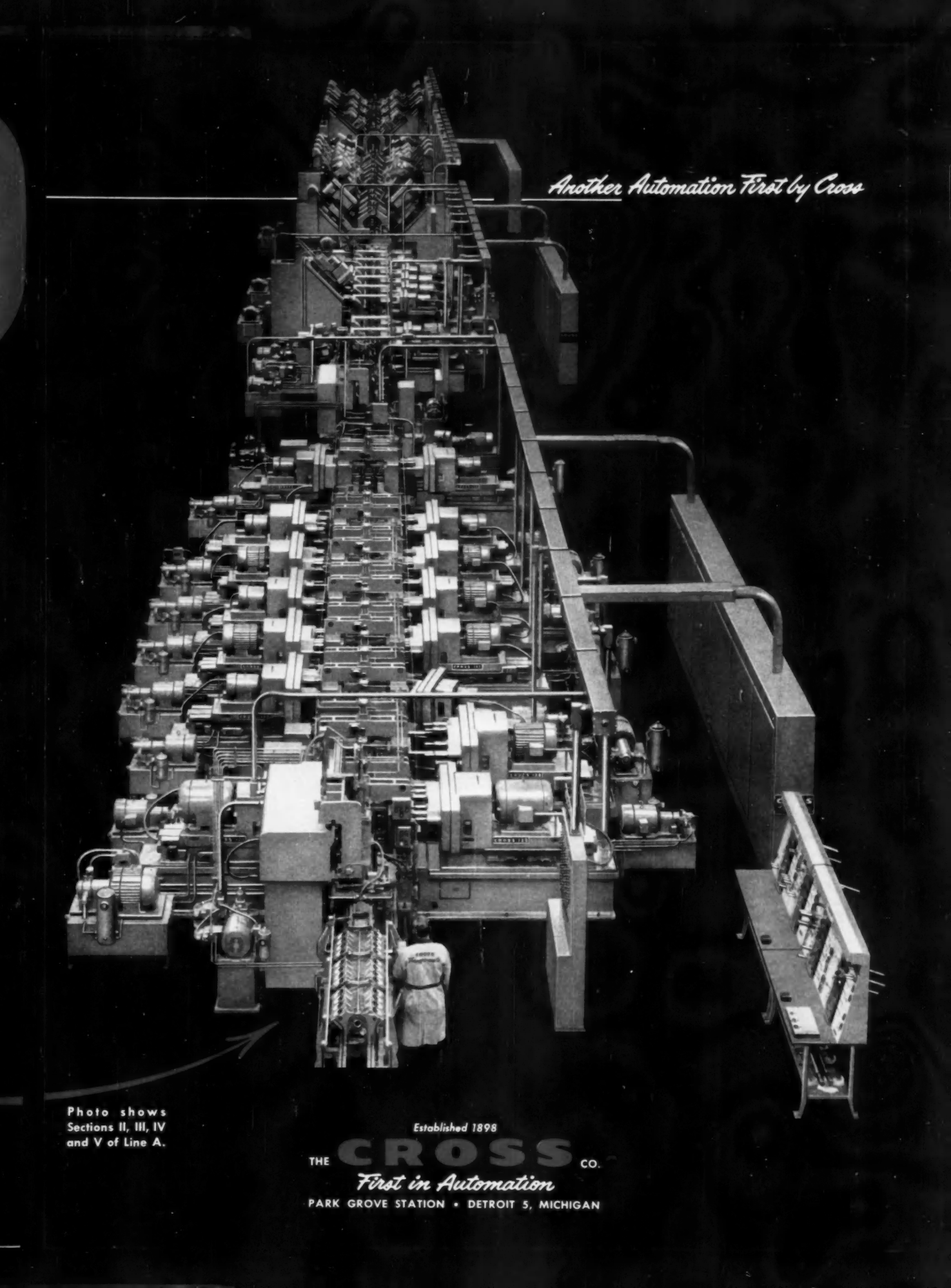


Photo shows
Sections II, III, IV
and V of Line A.

Established 1898

THE CROSS CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN



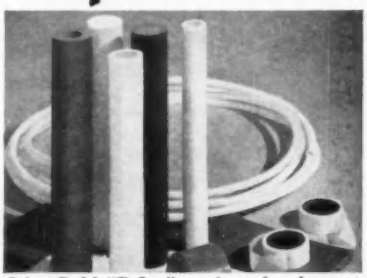
R/M FLEXIBLE THIN-WALL Teflon* HOSE

for extremes of corrosion, vibration and temperature

Corrosive fluids, high mechanical stresses, extreme ambient temperatures —R/M Flexible Thin-Wall "Teflon" Hose takes them all. It's your best assurance of high-integrity conveying lines.

This new hose—stainless steel wire-braided or rubber-covered — is extremely flexible and does not expand, contract or fatigue. It is designed for continuous operation at temperatures from −100° to +400°F, and is chemically inert to hydraulic fluids and synthetic lubricants.

This major contribution to safety and performance in the automotive and aviation industries is backed by all the resources of R/M, pioneer in the development of "Teflon" products. R/M Flexible Thin-Wall "Teflon" Hose is available through leading coupling manufacturers. A list of suppliers and complete specifications will be furnished on request. *A Du Pont trademark



Other R/M "Teflon" products for the automotive and aviation industries include rods, sheets, tubes and tape; centerless ground rods held to very close tolerances; stress-relieved molded rods and tubes; Raylon—a mechanical grade of "Teflon," having many of the properties of virgin "Teflon." For details, call or write R/M.

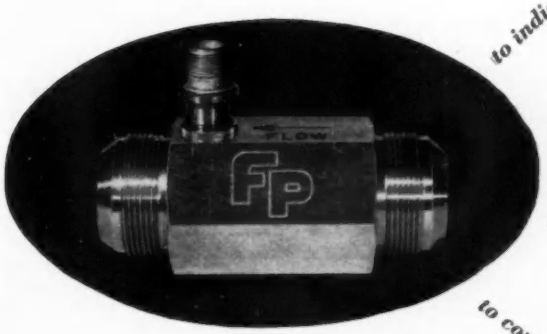
R/M

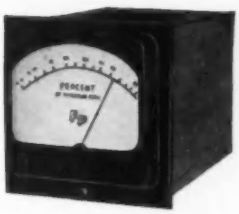
RAYBESTOS-MANHATTAN, INC.

PLASTIC PRODUCTS DIVISION, MANHEIM, PA.

FACTORIES: Manheim, Pa.; Paramount, Calif.; Bridgeport, Conn.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber • Sintered Metal Products • Rubber Covered Equipment Abrasive and Diamond Wheels • Brake Linings • Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls





PANEL FLOW RATE INDICATOR

to indicate flow



to indicate steady state flow condition

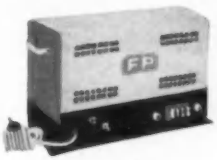
IN-LINE DIGITAL INDICATOR



to totalize flow for batch processes

DIGITAL TOTALIZER

to convert transient flow for analog output



FREQUENCY MULTIPLIER-CONVERTER

get flow information in any form you need it

. . . with F&P turbine meters and readout devices

Here's the ideal solution to flow metering problems characterized by high temperature, high pressure, high flow volume, or rapid flow transients. Fischer & Porter turbine meters are inherently among the most accurate flow measuring devices available today . . . providing measurements accurate to ½% of instantaneous rates.

The low inertia, axially balanced rotor of the F&P turbine meter gives optimum response to rapidly changing flow rates . . . providing positive information on changes as soon as they *begin*, not after they happen. A basic frequency output, directly proportional to flow, provides a common language easily fed to indicating, recording, or transmitting equipment. You can have digital or analog indication . . . oscilloscope recording . . . circular or strip chart recording . . . digital totalizing . . . transmission or any combination of these. Here are just a few of the Fischer & Porter output devices you can dovetail with one or more turbine meters:

PANEL FLOW RATE INDICATOR: Provides scale reading in desired flow units or in percentage of maximum flow. Includes amplifier which may be used to feed EPUT meters or integrators, and analog converter.

"IN-LINE" DIGITAL INDICATOR: Direct digital readout of flow information in desired gravimetric or volumetric units. Automatically selects turbine meter outputs by flow range.

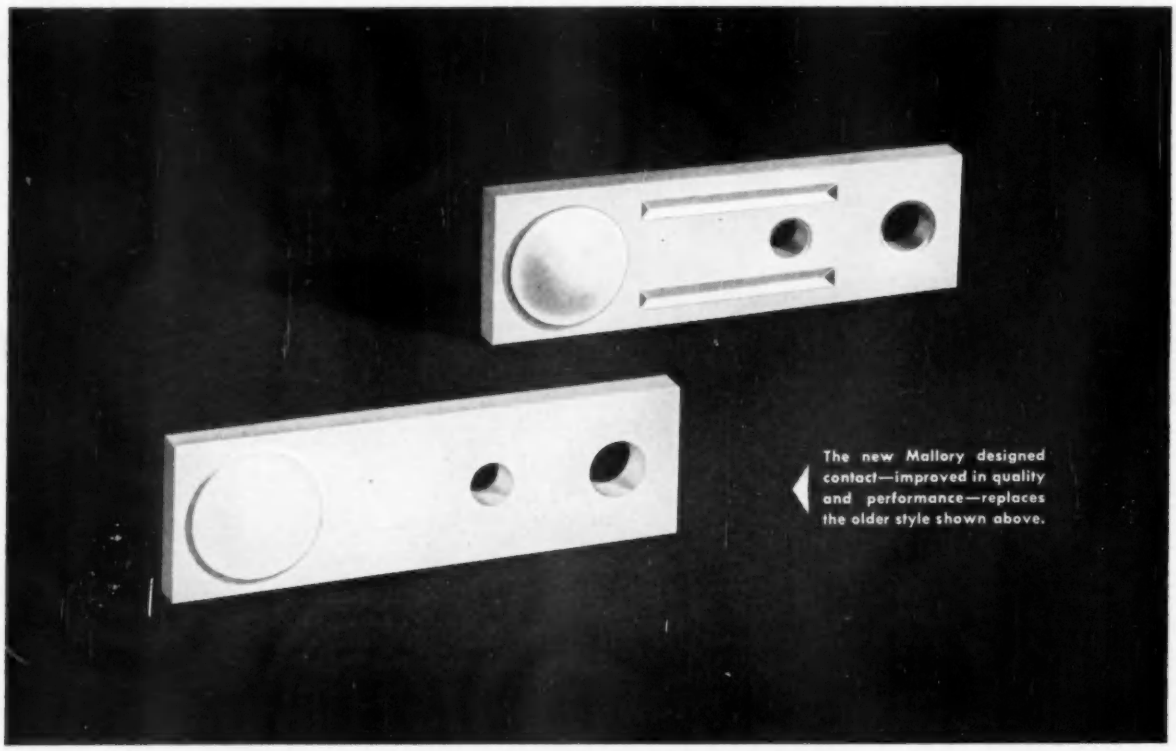
DIGITAL TOTALIZER: Provides integrated flow information accurate to ½%.

FREQUENCY MULTIPLIER-CONVERTER: Extremely rapid response to transient flow signals. Sampling of eight points per cycle provides more information than conventional means.

For complete data on the F&P turbine meter and some of the systems it makes possible, write for catalog. Address request to Fischer & Porter Co., 4797 County Line Road, Hatboro, Penna.

FISCHER & PORTER CO.

Complete Process Instrumentation



Production and Delivery Problems Solved by Mallory Contact Design Service

A major electrical equipment manufacturer required heavy duty contact assemblies made to rigid specifications. The original design called for hard drawn copper. To retain the hardness, contacts were brazed with a quick shot of heat—on a resistance welder. The silver solder frequently balled up, requiring hollow milling to remove surplus. Deliveries were often delayed—rejects ran high.

Mallory Contact Design Service proposed an alternate design. By switching to Mallory 3 metal, brazing was made easier. The use of Mallory 3 eliminated a hardening operation and enabled holes to be punched instead of drilled. Measured hardness at critical points is now guaranteed.

The customer benefited—almost no production problems, rejections were eliminated, delivery schedules could be met. Field life of the contacts within the finished equipment was greatly improved. Thanks to Mallory Contact Engineering Service, another customer got a better component, better service and a better product at no increase in cost.

FIVE MALLORY KEYS TO ECONOMY THROUGH CONTACT ENGINEERING

1. The most effective contact material from the extensive line developed by Mallory. More economical alloys often can satisfy *actual* service conditions.
2. The most economical contact design . . . for your purchasing, production and product needs.
3. The most economical backing material . . . from a group of Mallory alloys developed for this use.
4. The most economical backing member design in relation to contact and product design requirements.
5. The most economical method of assembling contact and backing member.

By coordinating *all* these important elements of contact design, Mallory can help you put into effect a long-range plan for cutting contact cost and assuring peak performance.

Serving Industry with These Products:

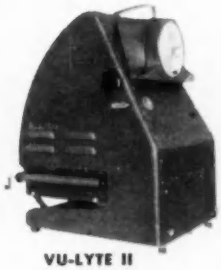
Electromechanical — Resistors • Switches • Tuning Devices • Vibrators
Electrochemical — Capacitors • Mercury and Zinc-Carbon Batteries
Metallurgical — Contacts • Special Metals • Welding Materials

P. R. MALLORY & CO. Inc.
MALLORY
P. R. MALLORY & CO. Inc., INDIANAPOLIS 6, INDIANA

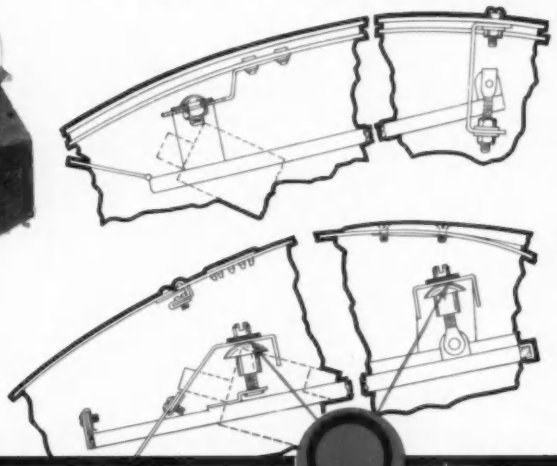
Waldes Truarc Rings cut assembly costs, improve performance of precision photo-optics equipment

Charles Beseler Co., E. Orange, N. J. uses Waldes Truarc Retaining Rings in 3 applications shown.

REFLECTING MIRROR ASSEMBLY IN OPAQUE PROJECTOR



VU-LYTE II PROJECTOR



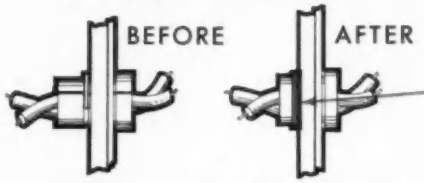
BEFORE

"The front surface mirror is the most precise optical element in a properly-functioning opaque projector," Beseler writes. "Previously we used this extremely cumbersome means of holding the mirror in position. As mirror adjustments are always required and the mirror is extremely delicate, our spoilage was terrific."

AFTER

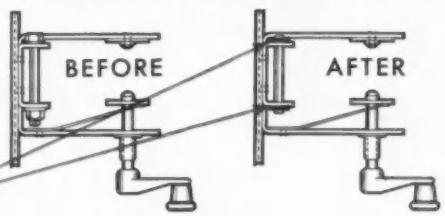
"Two Truarc Series 5100 Rings made possible complete redesign of the mirror assembly. Now mirrors can be adjusted from *outside* the projector. Rejects now are practically nil. More precise adjustment of the mirror is possible. And because of the greater ease in adjustment, we have cut labor costs $2.00 per unit."

HEAT ASSEMBLY IN PRINT DRIER



Here a Waldes Truarc crescent ring, Series 5103, replaced a split collar and clamping ring. Results: labor costs cut 50¢ per unit because of greater ease of assembly. Drier provides more uniform heating.

35 MM MICRO-FILM NEGATIVE CARRIER IN ENLARGER



2 Waldes Truarc Series 5133 E-Rings replaced 2 cap nuts—at a saving of 20¢ per unit in labor costs.

Whatever you make, there's a Waldes Truarc Ring designed to save you material, machining and labor costs, and to improve the functioning of your product.

In Truarc, you get

Complete Selection: 36 functionally different types. As many as 97 standard sizes within a ring type. 5 metal specifications and 14 different finishes. All types available quickly from leading OEM distributors in 90 stocking points throughout the U.S. and Canada.

Controlled Quality from engineering and raw materials through to the finished product. Every step in manufacture watched and checked in Waldes' own modern plant.

Field Engineering Service: More than 30 engineering-minded factory representatives and 700 field men are at your call.

Design and Engineering Service not only helps you select the proper type of ring for your purpose, but also helps you use it most efficiently. Send us your blueprints today...let our Truarc engineers help you solve design, assembly and production problems...without obligation.



WALDES
TRUARC®
RETAINING RINGS
WALDES KOHINOOR, INC.
47-16 AUSTEL PLACE, L. I. C. 1, N. Y.

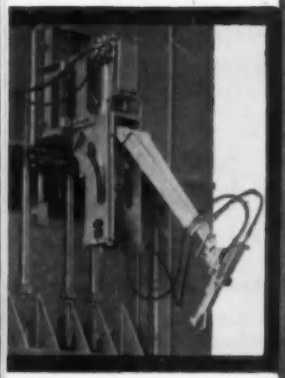
Waldes Kohinoor, Inc., 47-16 Austel Place, L.I.C. 1, N.Y.
Please send new, descriptive catalog showing all types of Truarc rings and representative case history applications. *(Please print)*

Name .....
Title .....
Company .....
Business Address .....
City ..... *Zone* ..... *State* .....

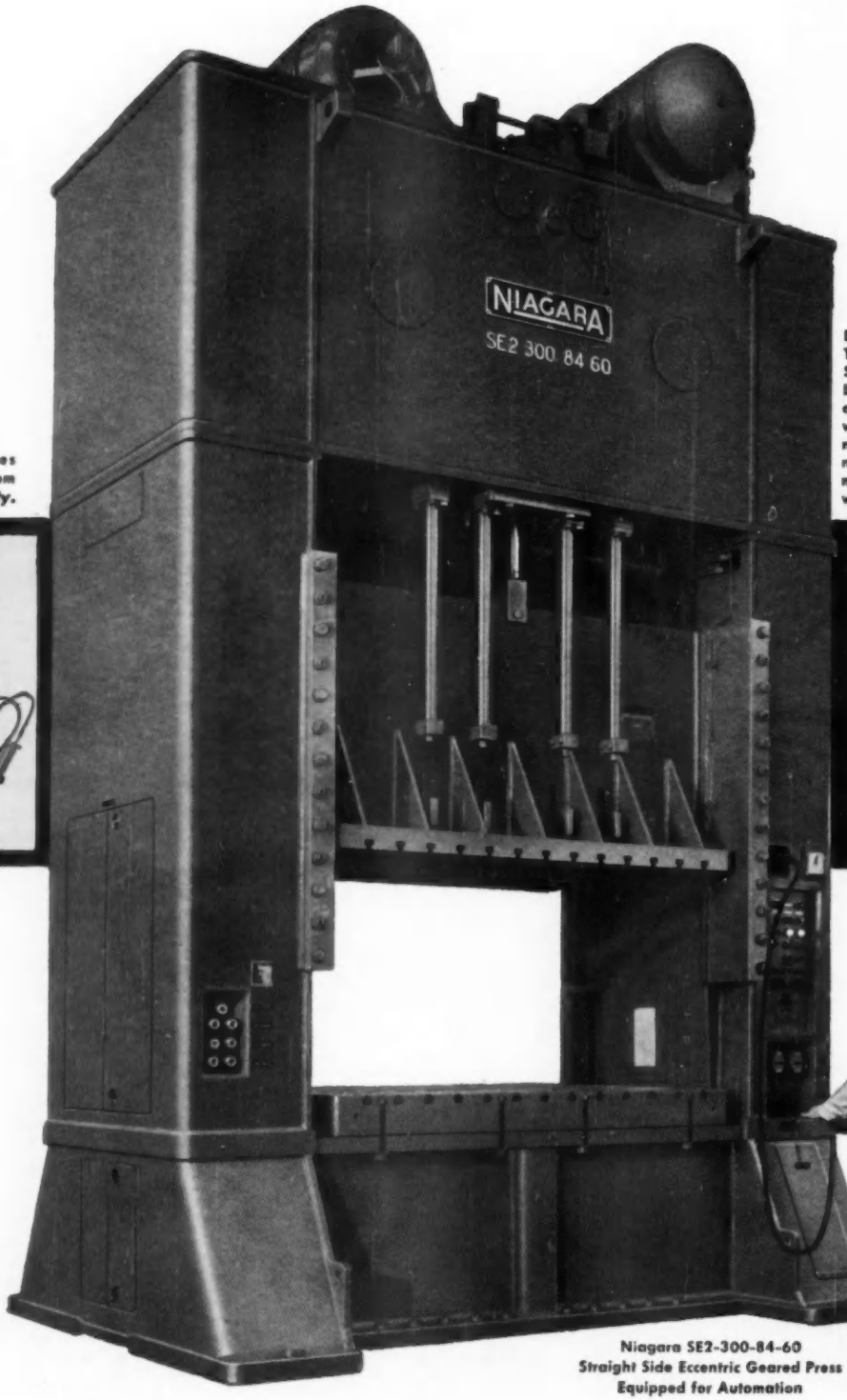
AI-9-57

WALDES TRUARC Retaining Rings, Grooving Tools, Pliers, Applicators and Dispensers are protected by one or more of the following U.S. Patents: 2,382,948; 2,411,426; 2,411,761; 2,416,852; 2,420,921; 2,428,341; 2,439,785; 2,441,846; 2,455,165; 2,483,379; 2,483,380; 2,483,383; 2,487,802; 2,487,803; 2,491,306; 2,491,310; 2,509,081; 2,544,631; 2,546,616; 2,547,263; 2,558,704; 2,574,034; 2,577,319; 2,595,787, and other U.S. Patents pending. Equal patent protection established in foreign countries.

see how mighty Niagara Presses



IRON HAND removes finished stampings from the press, *automatically.*



BRAIN CENTER OF THE AUTOMATION SYSTEM, the Rotary Limit Switch can be adjusted precisely while the press is in motion to synchronize automation mechanical devices with the press cycle.



Niagara SE2-300-84-60
Straight Side Eccentric Geared Press
Equipped for Automation

are automated for peak productivity

Engineered to excel in large, heavy tonnage drawing, punching and blanking work, Niagara Straight Side Eccentric Geared Presses are readily outfitted with the most advanced automation controls and devices. Net result: Streamlined production, greater safety and simplified operation.

Take a look at the modern, enclosed construction of this rugged Niagara Two-Point Eccentric Geared Press. See how today's most advanced automation controls and devices are furnished as integral, built-in components of the press itself . . . *with piping and wiring fully concealed.* Note, too, how the driving assembly is neatly housed within the crown. Nothing has been overlooked in making this press an outstanding engineering triumph.

Niagara's eccentric drive delivers greater torque with less deflection. Rigid, all-steel, four-piece, tie rod frame provides utmost accuracy and prolonged die life. Niagara's low inertia, pneumatic friction clutch runs cooler and outlives others, for most of its weight continues to rotate with the flywheel to reduce heat and wear.

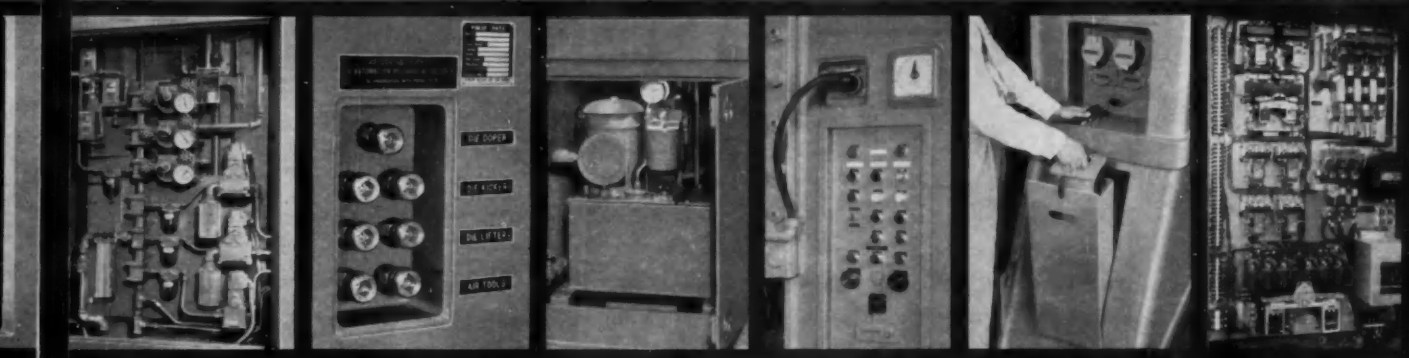
MAKE SURE THAT YOU HAVE ALL OF THE FACTS on Niagara Straight Side Eccentric Geared Presses . . . the one point, two point and four point designs in capacities from 100 - 1000 tons . . . and how they can be equipped for automation. Write for illustrated Bulletin 66 today.



NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N.Y.

DISTRICT OFFICES: Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U. S. cities and major foreign countries



AIR CONTROL PANEL (Above left) conceals and protects air line pressure switches, lubricators, filters, gauges and valves behind dust-tight doors within one of the uprights.

CONTROLLED AIR SUPPLY RECEPTACLES (Above right) are provided for die doper, die kicker and die lifter, all synchronized with press cycle. Auxiliary receptacles are for die maintenance tools.

AUTOMATIC CIRCULATING OIL SYSTEM (Above left) sends metered flow of clean, filtered oil to all bearings and gears in the crown, as well as to slide gibs. Correct operating oil pressure is maintained or press stops automatically.

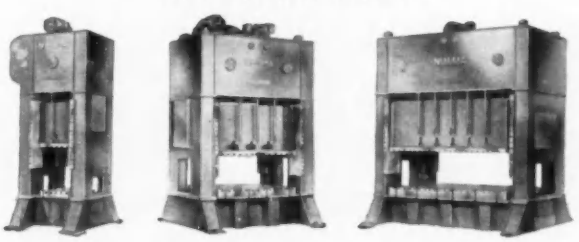
OPERATOR'S PANEL (Above right) features de-luxe operating controls conveniently arranged for fingertip direction of every press motion. Note receptacle for "RUN" push button station and Selsyn stroke position indicator.

AUX. POWER SUPPLY & SAFETY BLOCK. (Above left) Two 110 V. and two 440 V. receptacles for automation equipment, conveyors, tools, etc. Safety block (stored in bin) is chained to safety plug which de-energizes press control when pulled from receptacle.

COMB. MOTOR & PRESS CONTROL (Above right) in oil and dust-tight enclosure flush mounted in frame.

ONE-POINT, TWO-POINT AND FOUR-POINT SUSPENSION

(100 through 1000 ton capacities)

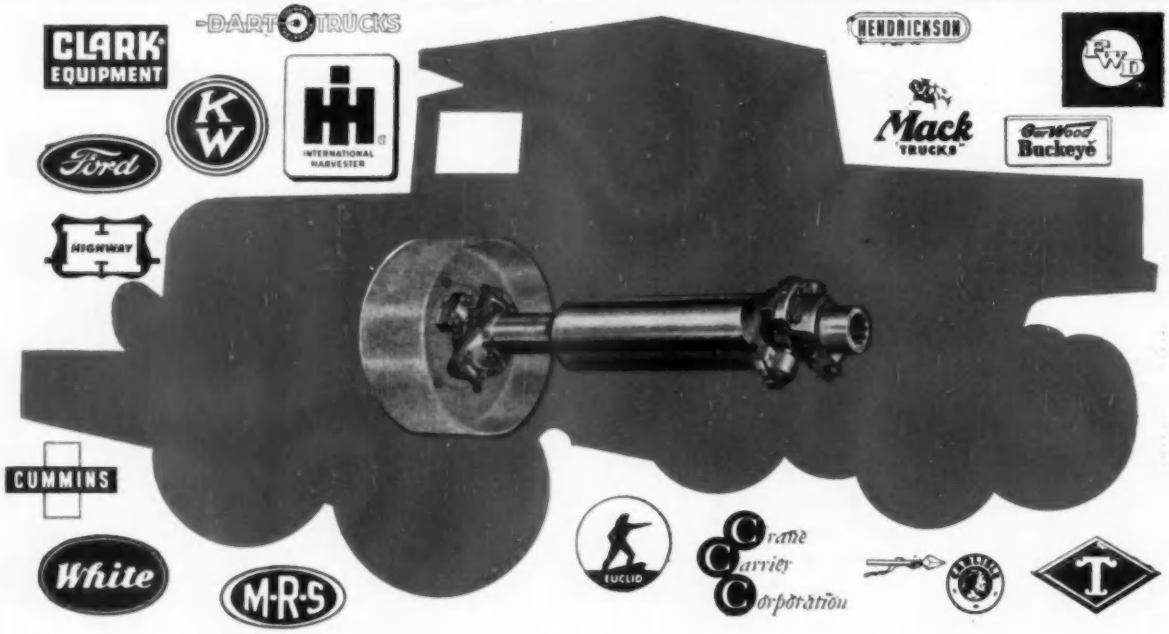


NIAGARA

straight side ECCENTRIC GEARED presses

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

RUGGED



Because MECHANICS Roller Bearing UNIVERSAL JOINTS drive through KEYS—instead of bolts—they stand up under punishment that shears off other types of fasteners. They are designed with less parts and connections for easy assembly and servicing — smooth running balance — maximum strength with less weight — and long, trouble-free, safe operation. Rugged stamina is just one of the advantages you get when you specify MECHANICS Roller Bearing UNIVERSAL JOINTS. Let MECHANICS engineers help you design this and other competitive sales features into your product's transmission train.

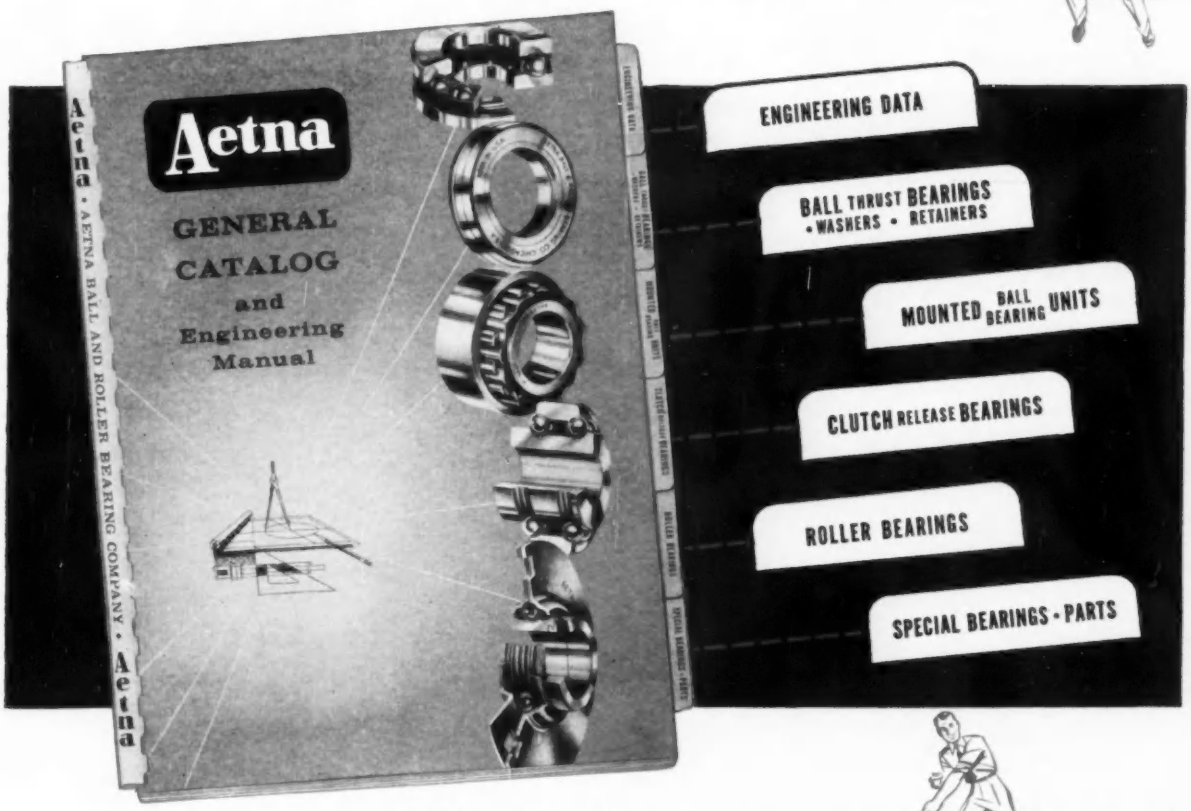
MECHANICS UNIVERSAL JOINT DIVISION
Borg-Warner • 2024 Harrison Ave., Rockford, Ill.

MECHANICS
Roller Bearing B-W
UNIVERSAL JOINTS

For Cars • Trucks • Tractors • Farm Implements • Road Machinery • Aircraft • Tanks • Busses and Industrial Equipment

BRAND NEW...

...and there's a copy waiting for you!



Write for it direct on your company letterhead

or call the nearest sales office 'phone number listed here

Albany, N.Y. ALbany 5-7568
Atlanta, Ga. JAckson 4-2831
Auburn, Me. LEwiston 4-5446
Baltimore, Md. MUlberry 5-2175
Bangor, Me. BAngor 2-4813
Binghamton, N.Y. BInghamton 3-5469
Birmingham, Ala. FAirfax 3-2591
Boston, Mass. ALgonquin 4-2802
Bridgeport, Conn. DRexel 8-2611
Buffalo, N.Y. UNiversity 5585
Charlotte, N. C. FRanklin 6-6577
Chicago, Ill. MIchigan 2-3513
Cincinnati, Ohio DUnbar 1-1678
Cleveland, Ohio PRospect 1-2020
Detroit, Mich. TRinity 5-7800
Elmira, N.Y. ELmira 3-9647
Hartford, Conn. ADams 3-4428
Houston, Tex. CApitol 8-8511
Jacksonville, Fla. ELgin 6-3357
Jamestown, N.Y. JAmestown 9-9200
Kansas City, Mo. BAltimore 1-9696
Lodi, N. J. HUbbard 8-8774
Long Island City, N.Y. EXeter 2-6116
Los Angeles, Calif. RIchmond 9-8114
New Brunswick, N. J. CHarter 9-5200
New Haven, Conn. SPruce 7-5567
New York, N.Y. BArclay 7-9152
Newark, N. J. MArket 3-5322
Niagara Falls, N.Y. Niagara Falls 4-8846
Philadelphia, Pa. POplar 5-1890
Portland, Ore. CApitol 7-0573
Poughkeepsie, N.Y. GLobe 2-3560
Providence, R. I. JAckson 1-6006
Richmond, Va. ELgin 9-2483
Rochester, N.Y. HAmilton 6-3390
San Diego, Calif. BElmont 4-6439
San Francisco, Calif. SUtter 1-0972
Seattle, Wash. MUtual 3232
Spokane, Wash. RIverside 7-7193
Stratford, Conn. DRexel 8-2611
Syracuse, N.Y. GRanite 4-7041
Trenton, N. J. OWen 5-3484
Utica, N.Y. UTica 2-4197
Waterbury, Conn. PLaza 3-2188
Wichita, Kans. AMhurst 5-5183
Worcester, Mass. PLeasant 2-1976

CANADA

Calgary, Alta. CHerry 4-7159
Dawson Creek, B. C. DAwson Creek 1103
Edmonton, Alta. EDmonton 46-478
Hamilton, Ont. LIberty 9-4172
Montreal, Que. UNiversity 6-6737
St. Catherines, Ont. MUtual 2-8673
Toronto, Ont. EMpire 2-1041
Vancouver, B. C. BAyview 4154
Winnipeg, Man. WInnipeg 93-4405

Aetna AETNA BALL AND ROLLER BEARING COMPANY

DIVISION OF PARKERSBURG-AETNA CORPORATION • 4600 SCHUBERT AVE., CHICAGO 39, ILL.

IN DETROIT—SAM T. KELLER, 1212 FISHER BUILDING

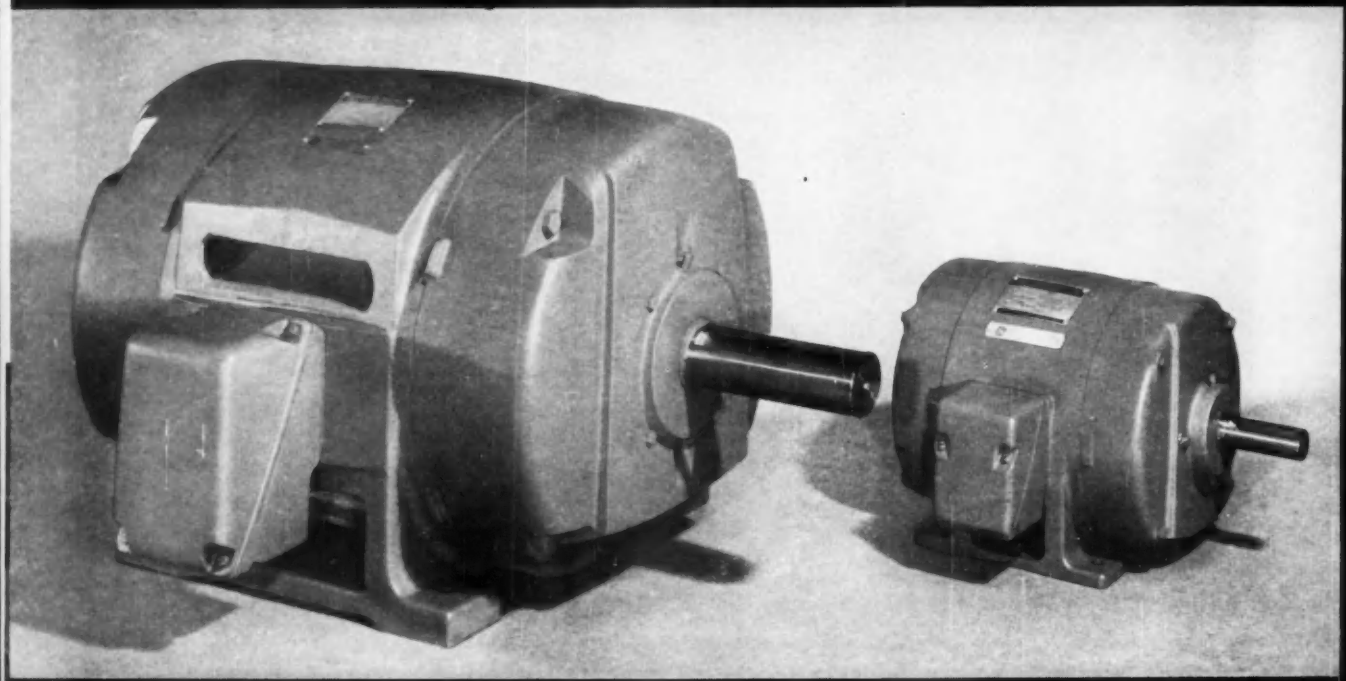
immediate shipment . . . all ratings

General Electric TRI 55 CLAD

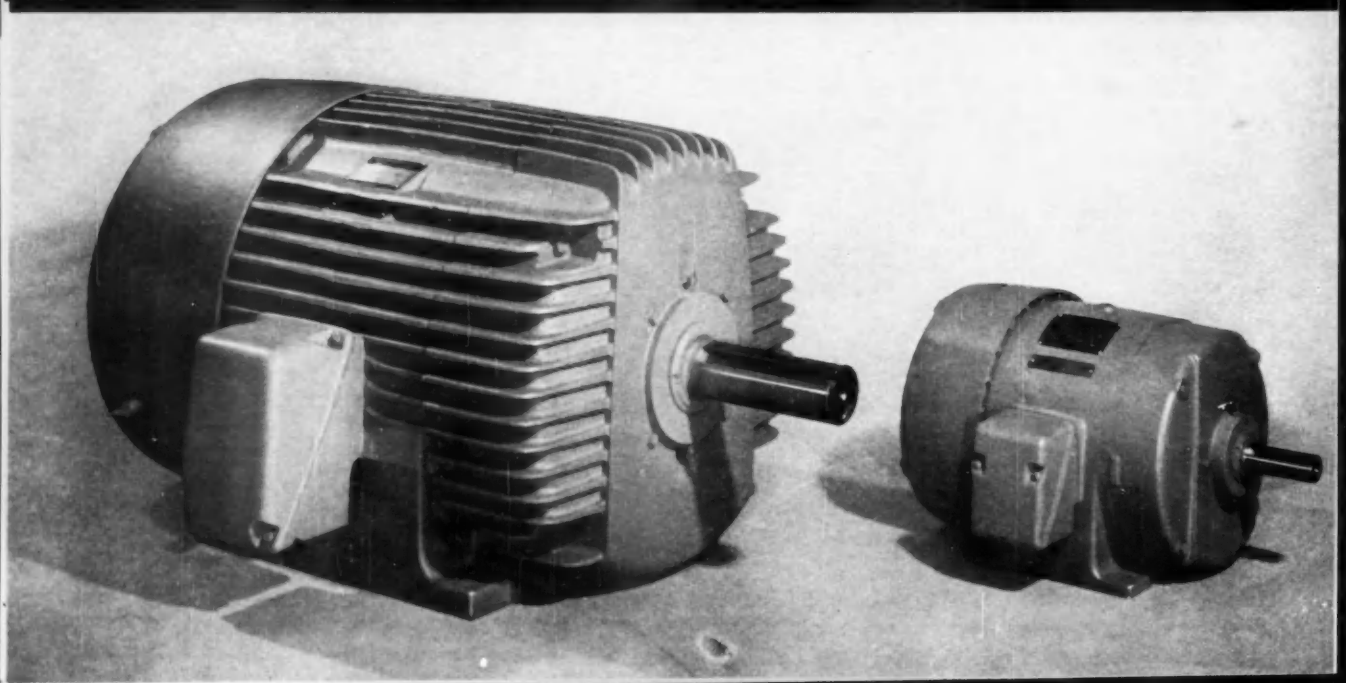
REG. U.S. PAT. OFF.

NOW UP

DRIPPROOF



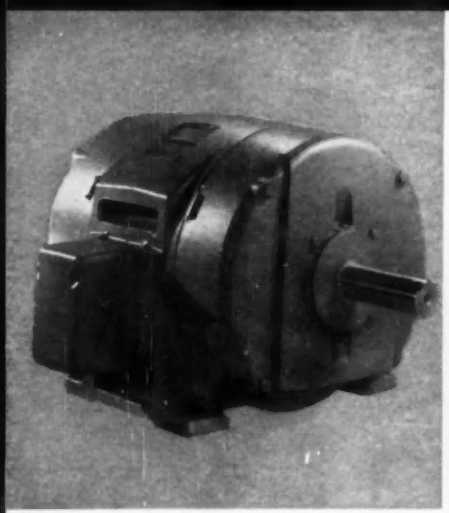
TOTALLY ENCLOSED



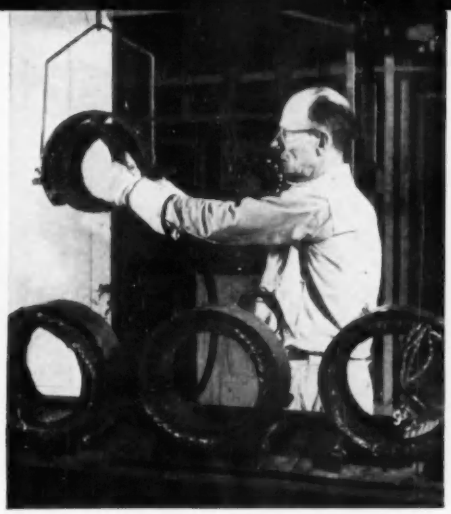
Motors in New NEMA Ratings

TO 125 HP

YEARS AHEAD BENEFITS

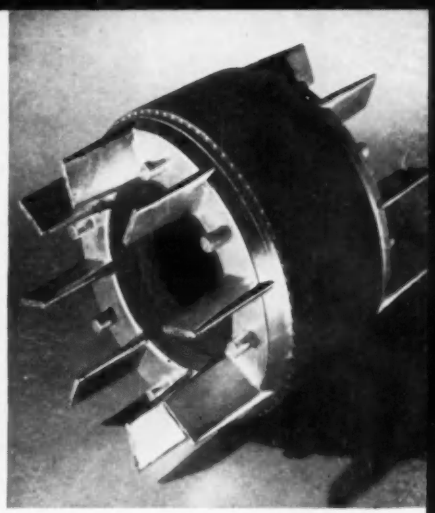


DESIGNED FOR GREATER PROTECTION—Better protected against physical damage by rugged cast-iron frame and endshields, new Tri-Clad '55' motors will handle many applications where ordinary dripproof motors cannot be applied.



BUILT TO PROVIDE LONGER LIFE—Longer stator life is provided through use of new, advanced insulation system utilizing Mylar* slot insulation, Formex® magnet wire, non-wicking Geoprene® leads and Dri-Film® silicone coating.

*Registered DuPont Co. Trade-mark.



ENGINEERED FOR TOP PERFORMANCE—Improved rotor is solid cast from commercially pure aluminum for greater strength, higher conductivity. Integrally cast rotor fans conduct heat to air stream more effectively than separately joined fans.

FOR COMPLETE INFORMATION

FOR COMPLETE DETAILS on the new line of Tri-Clad '55' motors up to 125 hp, contact your local G-E motor distributor or the sales engineer at your nearby General Electric Apparatus Sales Office. You will get expert assistance in selecting and applying the right motor for your particular application.

FOR FREE SLIDE RULE—which lets you determine at a glance the weight and space-saving benefits of recently announced NEMA standards for larger motors—and for informative, free General Electric Tri-Clad '55' motor bulletin, please send attached coupon.

Section 891-6
GENERAL ELECTRIC COMPANY
Schenectady 5, New York

Please send me the following publications:

☐ **FREE BULLETIN** (GEA-6602) describing the many advanced features of new Tri-Clad '55' motors up to 125 hp.

☐ **FREE SLIDE RULE** (GEN-148) to determine weight and space-saving benefits of new Tri-Clad '55' motors.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY & STATE_____

Progress Is Our Most Important Product

GENERAL ELECTRIC



. . . not delicate llamas, that balk at an overload.

. . . but highly functional load carriers, designed to carry more than normal, when necessary.

This "built-in" PLUS FACTOR pays dividends to truck owners and operators.

DETROIT STEEL PRODUCTS DIVISION

OF *Fenestra* INCORPORATED

1500 Trombly Avenue, Detroit 11, Michigan

DSP *Leaf* SPRINGS

* SINCE 1904 — ORIGINAL EQUIPMENT ON CARS, TRUCKS, CABS, BUSES, TRAILERS

BENDIX-WESTINGHOUSE AIR BRAKES
Best buy for your trucks because they're preferred by America's leading fleet operators!



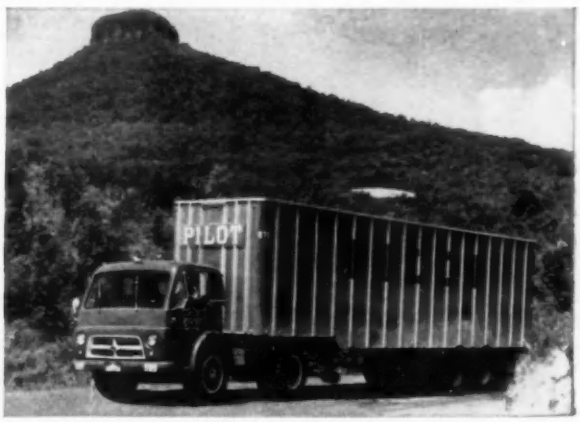
"DURING OUR 30 YEARS IN BUSINESS

We've bought 1500 trucks—and when it comes to Air Brakes, we prefer BENDIX-WESTINGHOUSE!"



MR. HERBERT S. McCARTHY,
Vice-President and General Manager
California Motor Express, Ltd.

From general headquarters in San Francisco, Mr. McCarthy directs the activities of one of California's leading trucking firms. Operating from Sacramento in the north to San Diego in the south, California Motor Express, Ltd., pioneered "overnight" service between the San Francisco Bay area and greater Los Angeles. The company rolled up some 8,000,000 miles in 1956 while operating on routes totaling 1,500 miles. California Motor Express, Ltd., maintains thirteen terminals and employs 850 people.



"DURING OUR 16 YEARS IN BUSINESS

We've bought 769 trucks—and when it comes to Air Brakes, we prefer BENDIX-WESTINGHOUSE!"

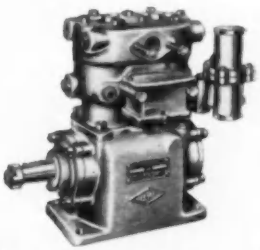


MR. R. Y. SHARPE, *President*
Pilot Freight Carriers, Inc.

For sixteen years Pilot Freight Carriers, Inc., has provided fast, efficient motor freight service along the eastern seaboard. With headquarters in Winston-Salem, N. C., this progressive firm last year rolled up a total of over 19 million miles while operating on all principal highways within a twelve state area. Pilot Freight Carriers, Inc., a highly safety-conscious organization, has developed two national champion and five state champion drivers. The company maintains 26 strategically located terminals and agencies and employs nearly 1,000 people.

For twenty-seven years Bendix-Westinghouse Air Brakes have been the first choice of truck manufacturers and truck operators everywhere, consistently outselling all other makes of air brakes combined. In fact, recognition of the greater safety, economy and dependability of Bendix-Westinghouse Air Brakes by truck buyers has resulted in their factory installation on an ever-increasing number of truck models of all sizes.

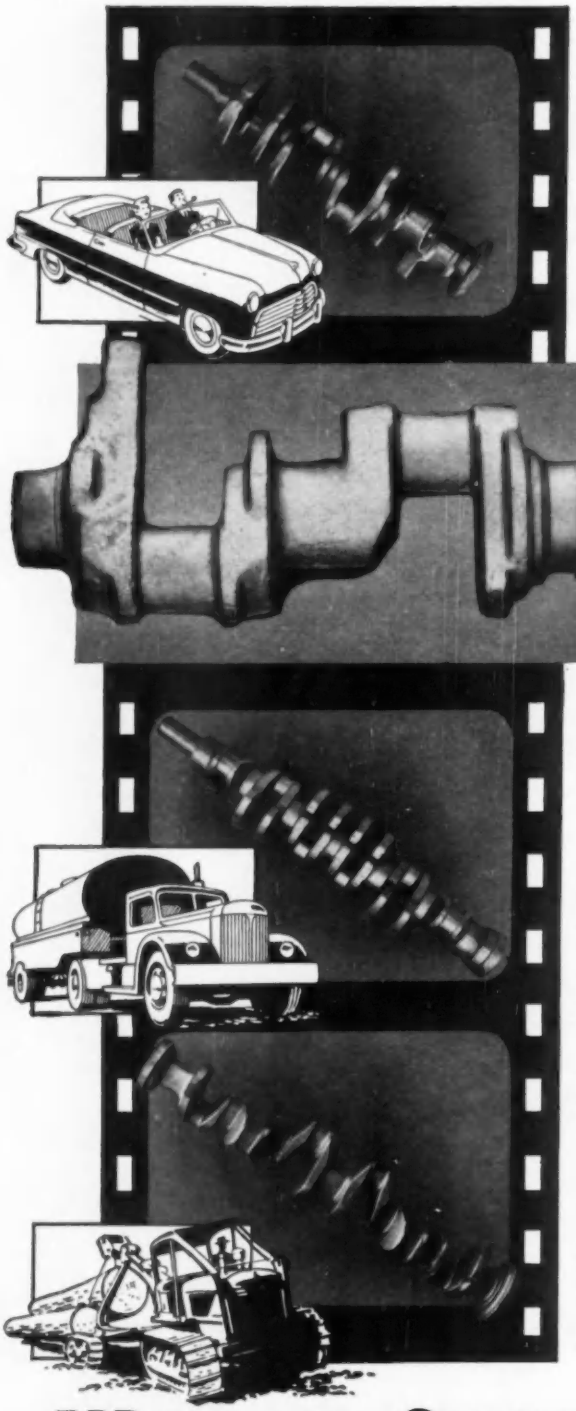
Chances are good that your trucks, too, offer the many advantages of these powerful brakes. If not, we suggest that you take advantage of the proven preference and superiority of Bendix-Westinghouse Air Brakes by offering them as factory-installed equipment. It's one sure and easy way to add more sales-appeal to your vehicles!



Over 2,000,000 compressors, produced over a twenty-seven-year span, stand behind the TU-FLO 400. Many advanced features guarantee performance no other compressor can equal.

Bendix-Westinghouse AIR BRAKES

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY • General offices and factory—Elyria, Ohio. • Branches—Berkeley, Calif., and Oklahoma City, Okla.



There's no substitute for the FORGED crankshaft

Crankshafts have been made successfully by other methods of fabrication and have proven to be *good enough* for certain non-critical applications—but for maximum dependability of the modern, compact, high compression, high torque engine a forged crankshaft is essential.

The forging process assures, to the greatest degree possible, uniformity and predictability of physical properties with a minimum variance from piece to piece or from one location to another in the same piece.

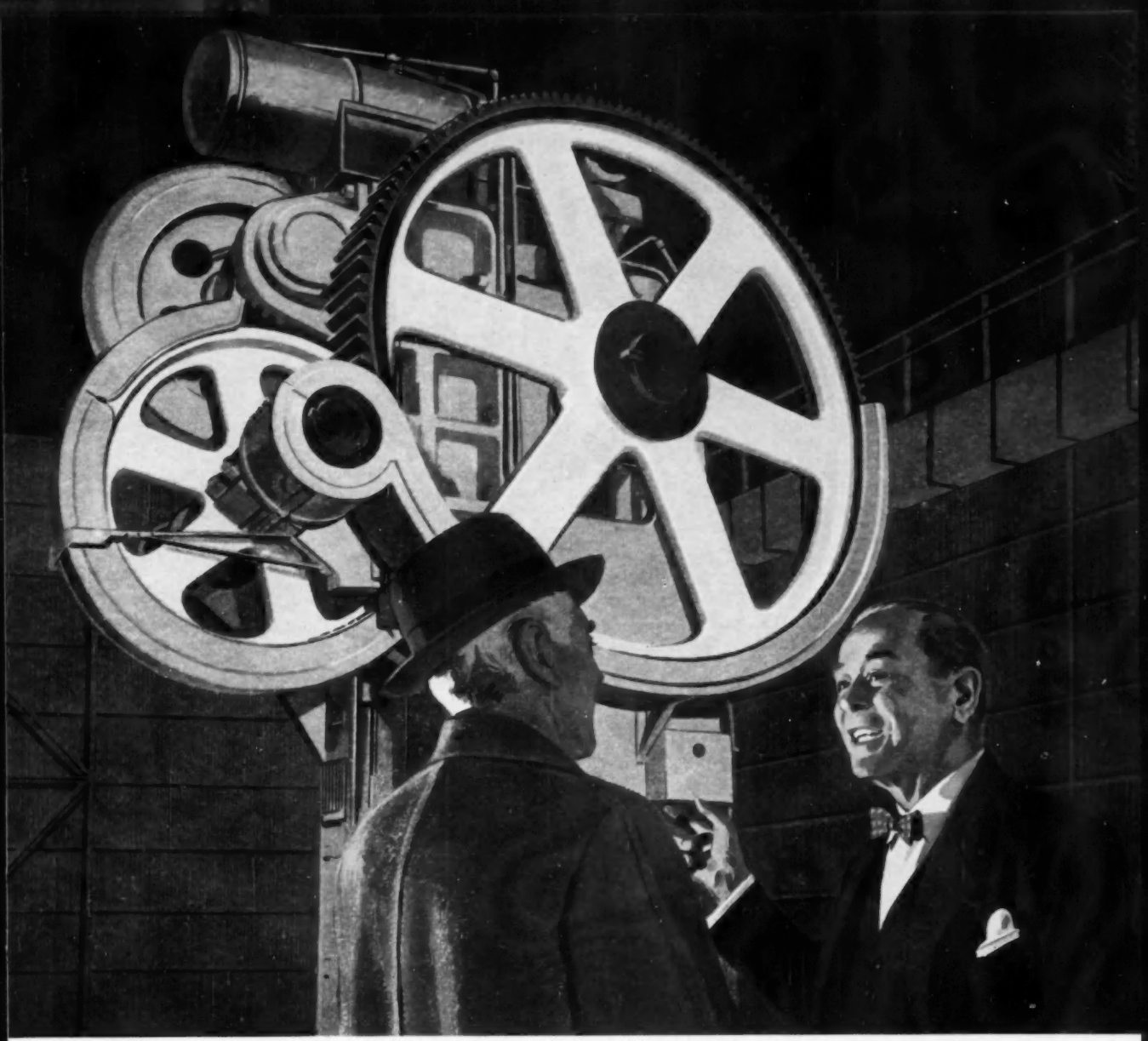
Wyman-Gordon has been forging crankshafts since the beginning of the internal combustion engine era and today produces more crankshafts for a greater variety of applications than any other company in the world. In a crankshaft there is no substitute for a forging, and in a forging there is no substitute for Wyman-Gordon quality and experience.

WYMAN-GORDON COMPANY

Established 1883

WORCESTER 1, MASSACHUSETTS
HARVEY, ILLINOIS • DETROIT, MICHIGAN

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL • TITANIUM



"A new press just wasn't in the cards...

so we rebuilt this one and saved ourselves a lot of money!" And it can be done with any Bliss press. Bliss has developed 42 modernization "packages"—pre-engineered assemblies—all you need to make an old press act young again. Add faster clutches, modern adjustments, more compact gearing, greater capacity. Do it in *your* own plant to keep downtime at a minimum. Or have Bliss do a complete rebuilding job for you.

Which is better? It's up to you. We'll give you the facts, but it's up to you. For here at Bliss, we consider the sale but the beginning of our responsibility. Which is what we mean when we say, "Bliss is more than a name... it's a guarantee."

BLISS
SINCE 1857

E. W. BLISS COMPANY · Canton, Ohio

100 years of making metal work for mankind

PRESSES · ROLLING MILLS · ROLLS · DIE SETS · CAN MACHINERY · CONTRACT MFG.

ANY PLATER CAN AFFORD
THIS NEW ANSWER TO AN
OLD CHROME PLATING PROBLEM



UDYLITE
ZERO-MIST H.T.*

NOW YOU CAN COMPLETELY CONTROL MIST AND SPRAY FROM CHROMIUM PLATING BATHS

AT A VERY REASONABLE COST

LOW INSTALLATION COST: This new product of Udylite Research is so powerful that you need add only 1½ *pounds* to a 1000 *gallon* chromium plating solution to get perfect results.

LOW MAINTENANCE COST: The addition of as little as ¼ to ½ lb. in an 8-hour working day maintains mist and spray control. Its only loss is through dragout.

COMPLETELY STABLE: It's *completely stable;* it doesn't lose any of its strength during shut downs no matter how long they must be.

OPERATES AT HIGH TEMPERATURES: For the first time *the temperature of the bath has no effect on mist control.* Zero-Mist H.T.* works at any bath temperature, even boiling.

EASE OF CONTROL: It's *easy to control.* With the addition of Zero-Mist H.T.*, a thin foam blanket subsides when current is turned off, but reforms as the bath is again used. This foam blanket provides the simple visible check for efficient operation.

LOW COST • VISUAL CONTROL
STABILITY • *HIGH TEMPERATURE OPERATION

ZERO-MIST H.T. HAS THEM ALL

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

CALENDAR

OF COMING SHOWS AND MEETINGS

Farnborough Air Show, England. Sept. 2-8
Canadian International Air Show, Toronto, Ont., Canada ..... Sept. 6-7
American Society for Quality Control, Aircraft Div., annual conference, Mark Hopkins Hotel, San Francisco, Calif. ..... Sept. 9-10
American Institute of Electrical Engineers, Petroleum Industry Conference, Sheraton Hotel, Philadelphia, Pa. ..... Sept. 9-11
SAE Tractor and Production Forum, Hotel Schroeder, Milwaukee, Wis. ..... Sept. 9-12
Instrument Automation Conference and Exhibit, Auditorium, Cleveland, O. ..... Sept. 9-13
National Petroleum Association, annual meeting, Traymore Hotel, Atlantic City, N. J. ..... Sept. 11-13
National Metal Trades Association, Eastern Plant Management Conference, Claridge Hotel, Atlantic City, N. J. ..... Sept. 11-14
Fifth European Machine Tool Exhibition, Hannover, Germany Sept. 15-24
American Die Casting Institute, annual meeting, Edgewater Beach Hotel, Chicago, Ill. ..... Sept. 17-20
American Machine Tool Distributors Association, annual meeting, Hotel Cleveland, Cleveland, O. Sept. 22-24
ASME Petroleum Mechanical Engineering Conference, Mayo, Tulsa, Okla. ..... Sept. 22-25
Standard Engineering Society, annual meeting, Hotel Commodore, New York, N. Y. ... Sept. 23-25
ASME Fall Meeting, Statler Hotel, Hartford, Conn. ..... Sept. 23-25
Material Handling Institute, Joint-Industry fall meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. ..... Sept. 30-Oct. 1
SAE National Aeronautic Meeting, Production Forum, and Engineering Display, Hotel Ambassador, Los Angeles, Calif. ... Oct. 1-5
National Electronics Conference, Hotel Sherman, Chicago, Ill.. Oct. 7-9
ASLE-ASME Lubrication Conference, Royal York Hotel, Toronto, Ont., Canada ..... Oct. 7-9
American Institute of Electrical Engineers, fall general meeting, Morrison Hotel, Chicago, Ill. Oct. 7-11
ASME - AIME Fuels Conference, Chateau Frontenac, Quebec, Canada ..... Oct. 10-12
Pressed Metal Institute, annual meeting, Castle Harbor, Bermuda ..... Oct. 13-17
International Motor Show, Earls Court, London, England ... Oct. 16-26
National Conference on Industrial Hydraulics, Hotel Sherman, Chicago, Ill. ..... Oct. 17-18
ASME Power Conference, Americus Hotel, Allentown, Pa... Oct. 21-23
Computer Applications Symposium, Hotel Sherman, Chicago, Ill. Oct. 23-24
American Society of Body Engineers, annual technical convention, Rackham Bldg., Detroit, Mich. ..... Oct. 23-25
National Industrial Packaging & Handling Exposition, Convention Hall, Atlantic City, N. J. Oct. 28-31
National Metals Exposition and Congress and Second World Metallurgical Congress, International Amphitheatre, Chicago, Ill. ..... Nov. 2-8

NAUGATUCK Paracril

THE OIL-RESISTANT NITRILE RUBBER



superior ozone resistance ● greatly increased flex life ● even higher abrasion resistance

The secret of obtaining these valuable new properties in the vulcanizate lies in a method—recently developed by Naugatuck research—of compounding PARACRIL® with other inexpensive materials. The additives modify and fortify the PARACRIL, greatly expanding its range of application. For example, in the manufacture of hose intended to carry or be used around oil or petroleum distillates, PARACRIL can now be used to make long-lasting *outer jackets* and oil-resistant tubing.

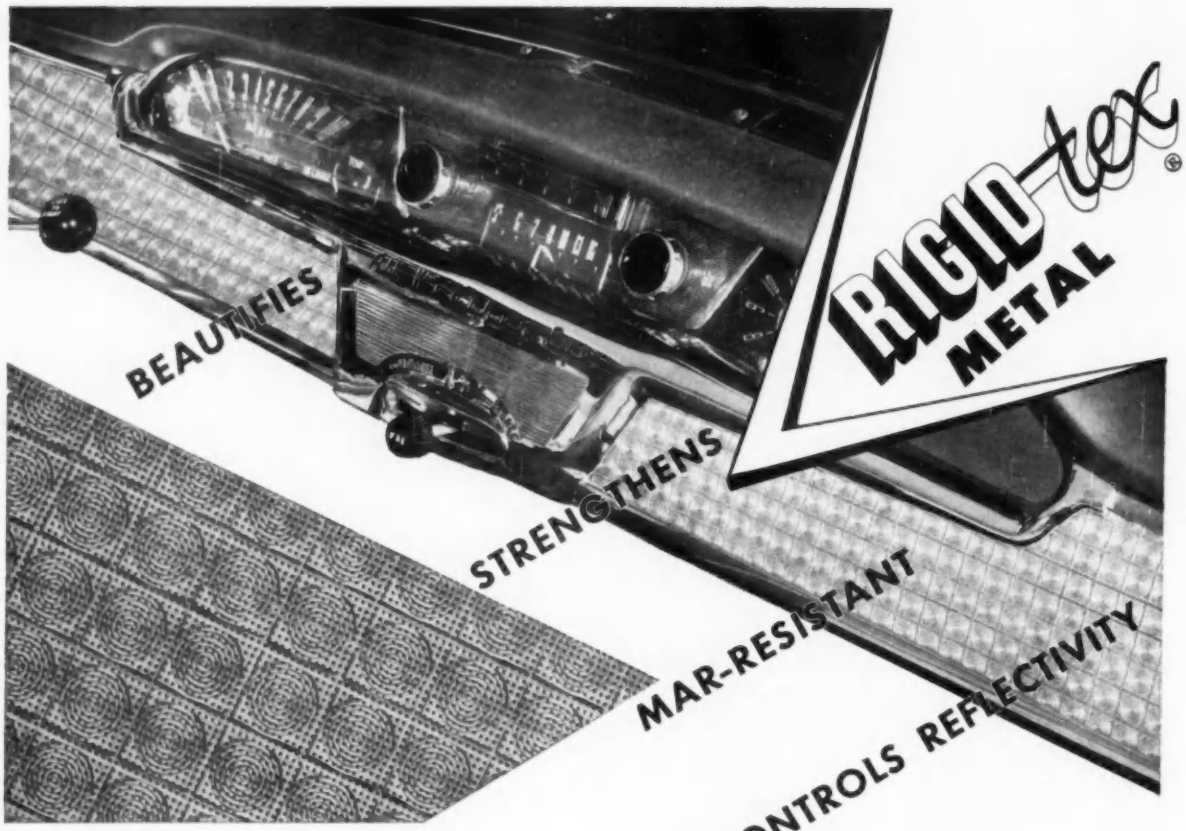
The compounding secret that makes PARACRIL the *ideal all-around oil-resistant rubber* is available to PARACRIL users from Naugatuck's synthetic rubber and rubber chemicals technical representatives. Write or wire to have one of them call on you.

Naugatuck Chemical

Division of United States Rubber Company, Naugatuck, Connecticut

US RUBBER

CANADA: Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmira, Ontario • Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • CABLE: Rubexport, N.Y.



Aluminum RIGID-tex Metal Perforated, Pattern — C-i-S
Shown Actual Size

and the Big News is *Color!*

The instrument panel of this modern car is RIGID-tex Metal, curved to follow the contour of the wrap-around windshield. As shown in the full-size pattern reproduction above, the RIGID-tex Metal is perforated. This permits any portion of the instrument panel to be used for the speaker grille. It has excellent tone and volume transmission properties because it does not accumulate sound deadening dust. The pattern upsets the perforations, providing better sound dispersion.

RIGID-tex Metal is ideal for instrument panels. Its beautiful, textured, mar-resistant surface breaks up reflected light into small geometric patterns which are eye-pleasing in contrast to the blinding glare reflected from flat metal.

And now RIGID-tex offers both texture and color, in one easily fabricated metal. The added scintillating beauty these patterns attain with the magic of color must be seen to be appreciated. The sparkling highlights, the richness of colored shadows, paints a picture in metal that varies with the light by which it is viewed. Now at long last RIGID-tex Metal makes it possible to bring enduring color to the instrument panel and other sheet metal parts to match interior décor of modern cars, with beauty and texture that catches the eye and sets the buying mood.

RIGID-tex Metal is available in any metal... any finish... any color, solid or perforated. There are more than 40 standard patterns from which to choose and new patterns are constantly being developed.

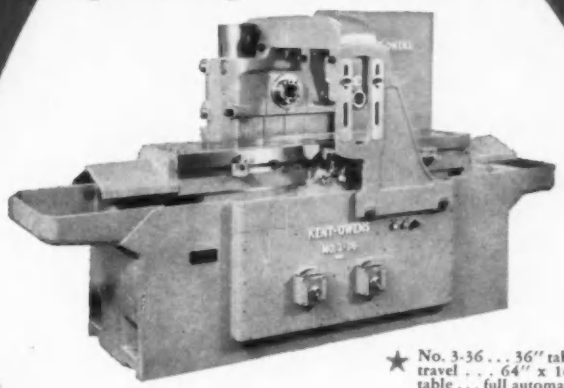
RIGID-tex® METAL
IT'S RIGIDIZED

See Sweet's Design File 1a/Ri or write us for information.

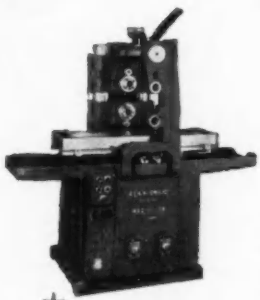
RIGIDIZED METALS CORPORATION
6719 OHIO STREET, BUFFALO 2, NEW YORK
SALES REPRESENTATIVES IN PRINCIPAL CITIES

Every one a Star

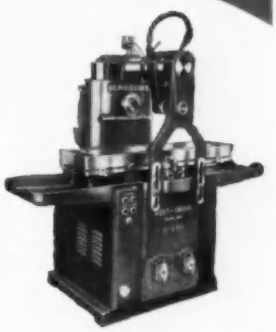
for speedy accurate milling!



★ No. 3-36 . . . 36″ table travel . . . 64″ x 16″ table . . . full automatic hydraulic feed.



★ No. 2-20DS . . . Double Spindle for two milling operations . . . 20″ table travel . . . 42″ x 12″ table. Hydraulic feed.



★ No. 2-20 . . . 20″ table travel . . . 42″ x 12″ table . . . full automatic hydraulic feed.

You'll turn out milling jobs with stepped up speed and accuracy with the work on Kent-Owens Machines! These extra-rugged Millers are performance-proved . . . simple . . . versatile . . . practical in every detail. Advanced features throughout! Twin-post head mounting assures balanced load. Only two gear contacts, motor to spindle, means greater cutting efficiency. Check your needs! Write today for bulletins on wide range of hydraulic and hand-operated machines. Also, let Kent-Owens design and build your tooling and special machines. Kent-Owens Machine Co., Toledo, Ohio.



★ No. 1-14 . . . 14″ table travel . . . 32″ x 9″ table . . . hydraulic table feed . . . full automatic cycle.



★ No. 1-M . . . Hand feed to table and head . . . 25″ x 9″ table travel . . . head counter-balance is adjustable.

CALL ON

KENT-OWENS

for milling machines

KENT-OWENS REPRESENTATIVES

BOSTON
General Machinery Corp.

BUFFALO
Bowler Hydraulic Mach'y Co.

CHICAGO
Fred Stone Mach'y Company

CLEVELAND
Garner Machinery, Inc.

DALLAS
Hoover Machine Tool Co.

DAYTON
C. H. G. Stone Mach'y Co.

DETROIT
A. C. Habenstein Mach'y Co.

FT. WAYNE
Orrel Machinery Co.

GRAND RAPIDS
Jensen Manufacturing Co.

HAMILTON, ONT.
E. F. Burke Mach'y Company

HARTFORD
Harrington Machinery, Inc.

HOUSTON
Oliver H. Van Horn Co., Inc.

INDIANAPOLIS
Orrel Machinery Co.

KANSAS CITY
Hickman Machinery Co.

LOS ANGELES
Machinery Sales Co.

MILWAUKEE
Fred Stone Mach'y Company

MINNEAPOLIS
The Interlake Company

MOLINE
James F. Normoyle Co.

MONTREAL
E. F. Burke Mach'y Co.

NEW ORLEANS
Oliver H. Van Horn Co., Inc.

NEW YORK
Harrington-Wilson-Brown Corporation

PHILADELPHIA
Gehr Machinery Company

PITTSBURGH
Barnes Machinery Company

ROCHESTER
R. W. Schaefer Machinery Co.

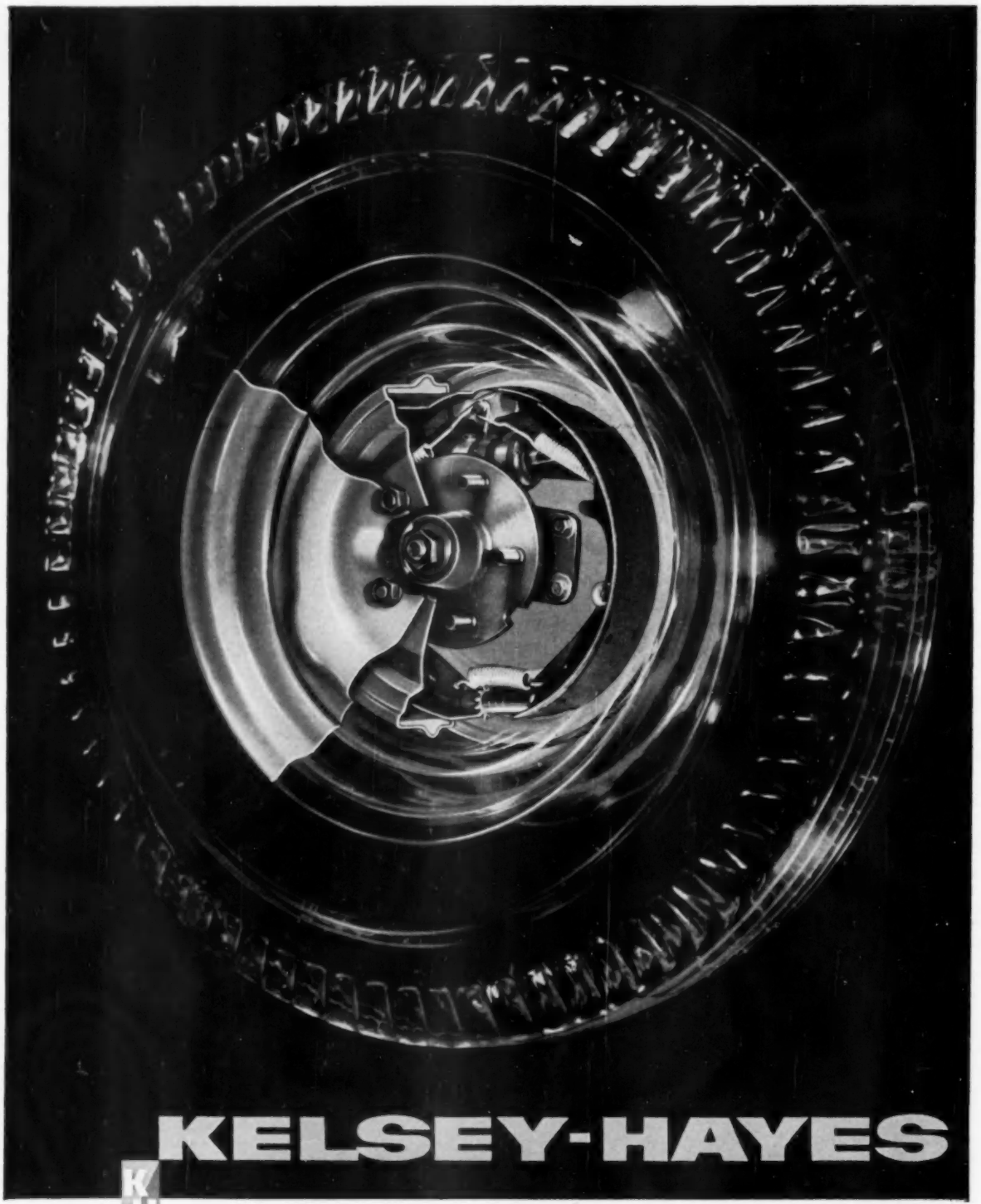
SAN FRANCISCO
Bohnet Machinery Co.

ST. LOUIS
Wm. Isbister Company

SYRACUSE
J. F. Owens Mach'y Company

TORONTO, ONT.
E. F. Burke Mach'y Company

WINDSOR, ONT.
E. F. Burke Mach'y Company



KELSEY-HAYES COMPANY
Gen'l Offices: Detroit 32, Mich.
Automotive, Aviation and Agricultural Parts • Hand Tools for Industry and Home
15 Plants: Detroit and Jackson, Mich.; Los Angeles; McKeesport, Pa.; Springfield, Ohio (Speco Division); Utica, N. Y. (Utica Drop Forge & Tool Division); Davenport, Iowa (Farm Implement and Wheel Division); Windsor, Ont., Canada.

Reflected in this modern motor car wheel, hub-and-drum, and brake assembly are the precision and excellence of quality which have earned for Kelsey-Hayes a respected name among suppliers to the automotive industry since 1908. Products representative of the specialized skills and facilities of Kelsey-Hayes in the manufacture of fine automotive parts and components include: *wheels, brakes, hubs and drums, power brakes, transmission bands and other chassis parts.*



Memo to a Man of "Parts"

The number of different parts made from Roebling High Carbon Specialties, Flat Wire and Spring Steel are close to countless.

Some things you can count on, though, are the consistent dimensional and mechanical uniformity you get with any Roebling High Carbon Specialty. They are the qualities that contribute to speeding *your* production and cutting *your* costs.

They are high qualities that make for high values. Next time you need flat wire or spring steel, specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

ROADBUILDING EQUIPMENT sets the pace for modern highway construction. It is exposed to all kinds of weather, needs the positive protection offered by the Granodine coating and the paint finish it so tenaciously bonds to the metal.



ACP Granodine® ANCHORS THE FINISH

ON FARM AND CONSTRUCTION EQUIPMENT



FARM EQUIPMENT, TOO, must be protected under good and bad weather conditions. ACP Granodine phosphate coating under paint affords this extra needed protection.



TRUCKS AND TRACTOR-TRAILERS work night and day all year round. Ice and snow, rain and heat attack the paint finish. ACP Granodine anchors it.

Weather, dirt and abrasion are archenemies of farm and construction equipment. To protect the metal, a durable and tenacious paint finish is required. ACP Granodine provides the base for such a finish. It chemically converts steel surfaces to a nonmetallic phosphate coating. This base not only increases the adhesion of the finish, but also greatly improves the corrosion resistance of the finishing system even when used in conjunction with a relatively thin and flexible paint film. ACP Granodine coatings are economically applied to steel surfaces by dipping, spraying or brushing.

LEARN ALL ABOUT ACP GRANODINE. Bulletin 1380 describes the various types of ACP Granodine and gives information which will help you select the proper type for your particular application. Write for your copy today.

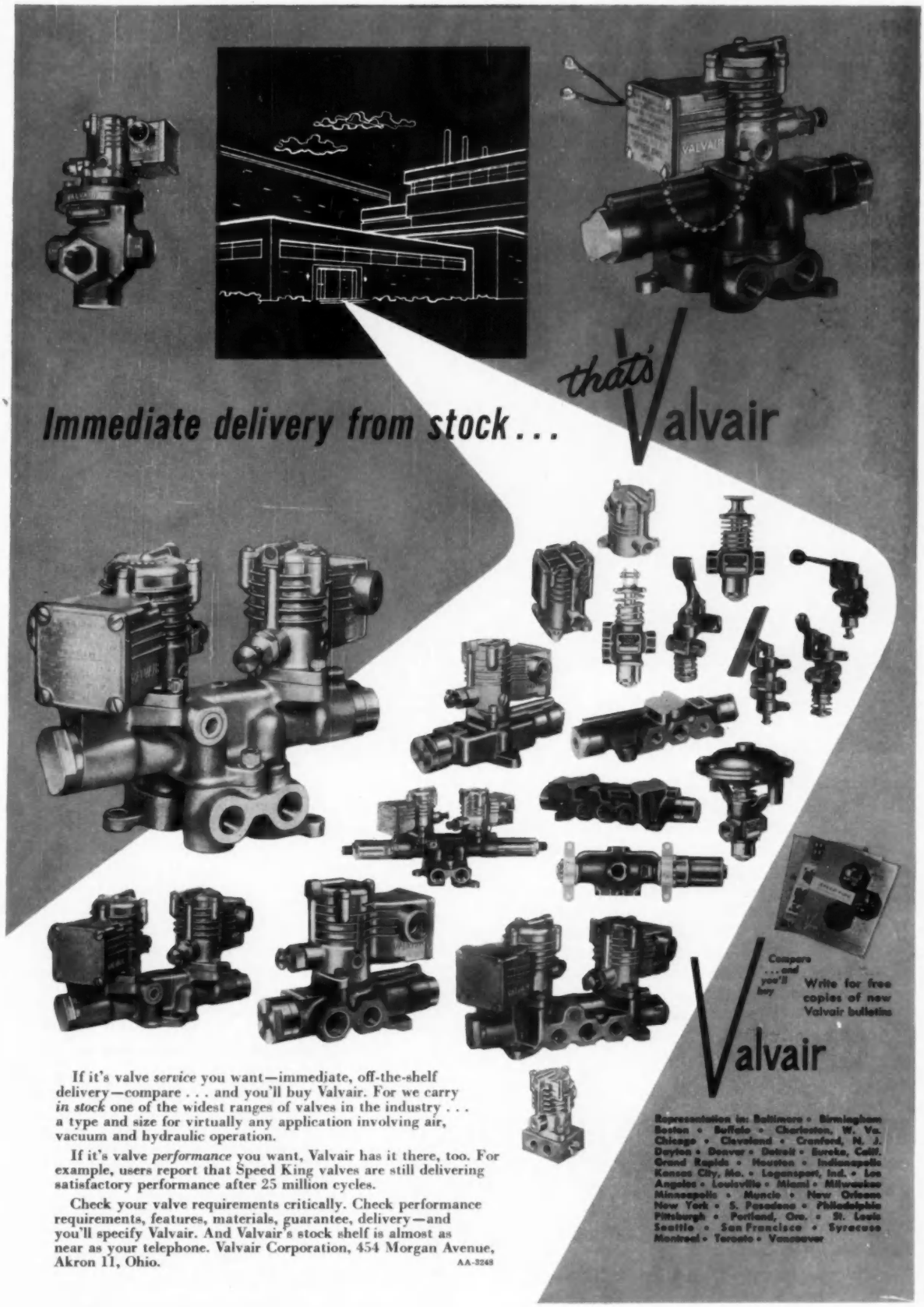


AMERICAN CHEMICAL PAINT COMPANY, Ambler 24, Pa.

DETROIT, MICH. • ST. JOSEPH, MO. • N'LES, CALIF. • WINDSOR, ONT.

CHEMICALS ACP PROCESSES

New Chemical Horizons for Industry and Agriculture



If it's valve *service* you want—immediate, off-the-shelf delivery—compare . . . and you'll buy Valvair. For we carry *in stock* one of the widest ranges of valves in the industry . . . a type and size for virtually any application involving air, vacuum and hydraulic operation.

If it's valve *performance* you want, Valvair has it there, too. For example, users report that Speed King valves are still delivering satisfactory performance after 25 million cycles.

Check your valve requirements critically. Check performance requirements, features, materials, guarantee, delivery—and you'll specify Valvair. And Valvair's stock shelf is almost as near as your telephone. Valvair Corporation, 454 Morgan Avenue, Akron 11, Ohio.

AA-3248

Why BUNDY Tubing Company uses A.W. Cold Rolled Steel



When 95% of today's cars use Bundy Tubing in an average of twenty applications, you can bet that the tubing must be right . . . and that the requirements placed on steel quality are exacting.

Bundy requires sheet steel that will meet tough demands of precision forming . . . provide top end-product performance over long miles of road wear . . . yet hold tubing production costs in line with vigorous competition.

Alan Wood produces and delivers cold rolled sheet to Bundy . . . and all other customers . . . on an "individual" order basis. Alan Wood's own metallurgists investigate the uses of customers' end-products and fabricating methods —then control the production of steel for each customer through each step—from mine to mill.

As a result, customers have steel to exact specifications. Production down time is minimized and rejects due to sub-standard material are cut . . . all of which helps improve customers' profits!

If your product requires uniform, high-quality steel, investigate the advantages of Alan Wood services and integrated production. Write Marketing Div., Dept. CR-S62, today.

ALAN WOOD STEEL COMPANY

steelmasters for more than a century and a quarter • CONSHOHOCKEN, PA.

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia New York • Los Angeles • Atlanta • Boston • Buffalo • Cincinnati Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul San Francisco • Seattle

Montreal and Toronto, Canada—A. C. Leslie & Co., Limited

IRON PRODUCTS
"Swede" *pig iron*

STEEL PRODUCTS
Plates (sheared)
A.W. Dynalloy (high strength steel)
Hot rolled sheets
Hot rolled strip
Cold rolled sheets
Cold rolled strip

ROLLED STEEL FLOOR PLATE
A.W. ALGRIP *abrasive*
A.W. SUPER-DIAMOND *pattern*

COAL CHEMICALS

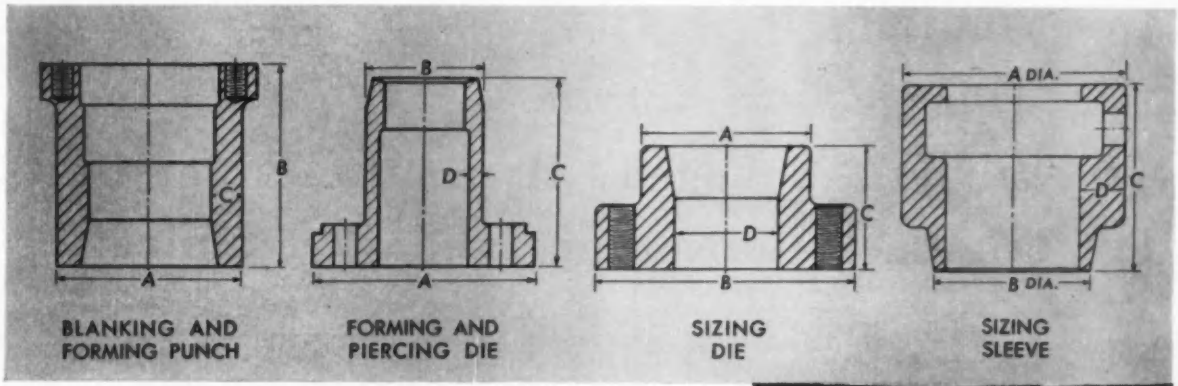
A.W. CUT NAILS
Standard & Hardened

MINE PRODUCTS
Iron ore concentrates
Iron powder
Crushed stone
Sand

COKE
Foundry, industrial & metallurgical

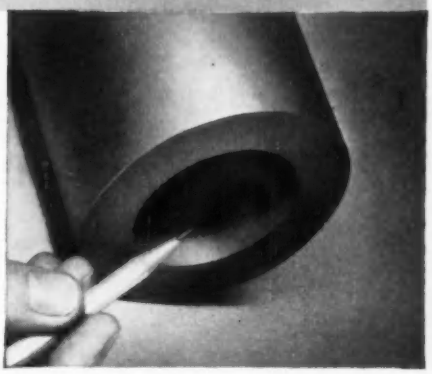
PENCO METAL PRODUCTS DIVISION
Steel cabinets, lockers & shelving

Do you make ring-shaped tool steel parts like these?



Graph-Mo Hollow-Bar® can cut your costs because the hole's already there

Eliminates drilling, machines faster



YOU start with finish boring when you use Graph-Mo Hollow-Bar®. The hole's already there! Because drilling is eliminated, you cut costs and speed production. And you get a tool steel that machines faster, wears longer, gives more stability.

Graph-Mo machines faster than ordinary tool steels because of the free graphite in its structure. And there's far less tendency to pick up, scuff or gall.

Reports from users show that Graph-Mo outwears other tool steels three to one on the average. That's because of the combination of free graphite and diamond-hard carbides in Graph-Mo's structure.

And you won't find a more stable tool steel than Graph-Mo. Proof: after 12 years of use, a master plug gauge machined from Graph-Mo showed less than 10 millionths of an inch dimensional change.

Specify new Graph-Mo Hollow-Bar for all your ring-shaped tool steel parts. You'll save time and money, have a better finished product. It's available in O.D. from 3 to 16 inches with many wall thicknesses.

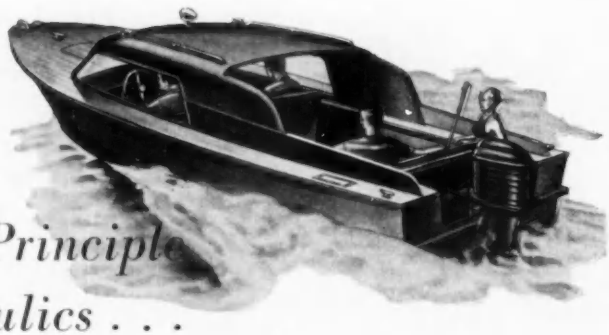
For more information write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

See the first Timken Televent hour, in color, "Eleven against the ice—story of the Antarctica Turnpike". NBC-TV, Monday night, Sept. 23rd.



The "Outboard Motor" Principle
Applied to Hydraulics . . .

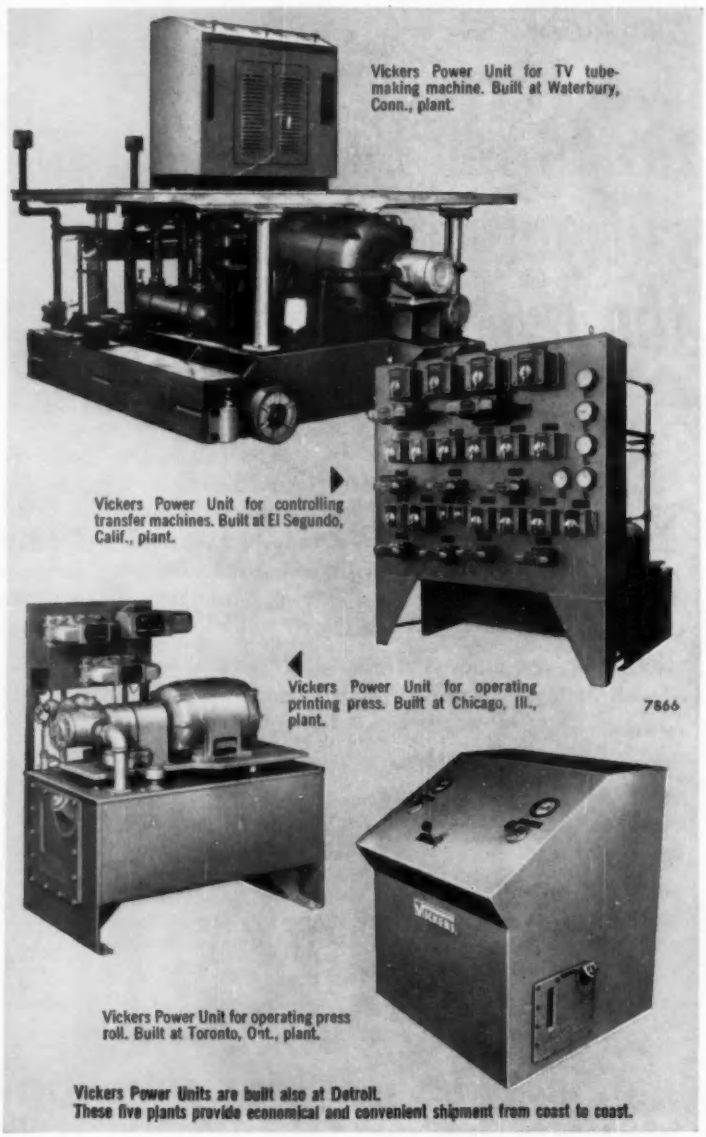
VICKERS® "Packaged" Hydraulic Power Units Are Compact, Convenient and Economical

The outboard motor is popular because it is a complete, self contained power package . . . quick and easy to apply.

Vickers Custom-Built Power Units provide a comparable packaged system for the hydraulics of any particular machine or job. Built to the exact needs, it is compact, efficient, and very quick and easy to apply.

All necessary pumps, valves, intermediate piping, motors, controls, oil reservoir, oil filters, air cleaners, oil level gauges, fittings, etc. are included, as well as electronic components if used.

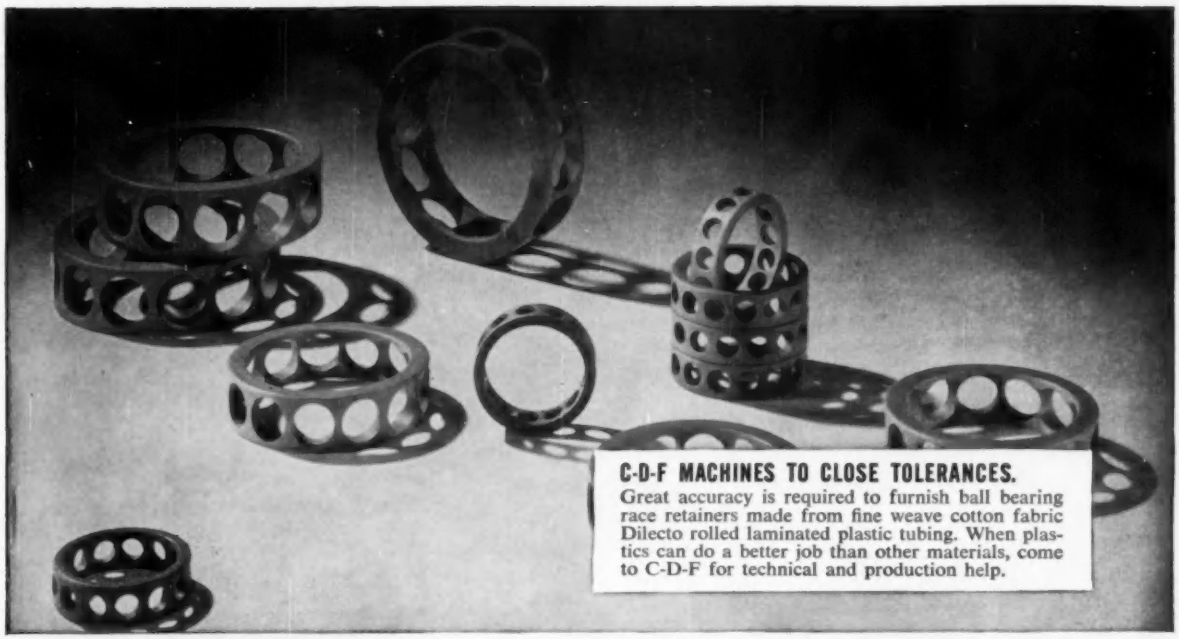
You are assured dependable performance. Design is improved and simplified, time and cost of installation are reduced, appearance is better, servicing is easy. Each unit is pretested at the factory and is ready for immediate operation. Vickers undivided responsibility for the entire hydraulic control system is important to both the machine builder and his customer. Write for Bulletin 52-45.



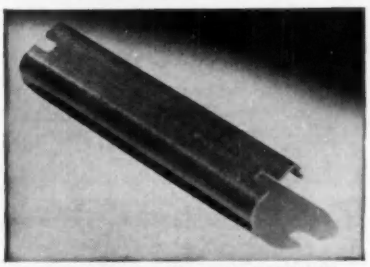
VICKERS INCORPORATED
DIVISION OF SPERRY RAND CORPORATION
Machinery Hydraulics Division
ADMINISTRATIVE and ENGINEERING CENTER
Department 1428 • Detroit 32, Michigan

Application Engineering Offices: **ATLANTA • CHICAGO CINCINNATI • CLEVELAND • DETROIT • GRAND RAPIDS HOUSTON • LOS ANGELES AREA (El Segundo) • MINNEAPOLIS NEW YORK AREA (Summit, N.J.) • PHILADELPHIA AREA (Media) • PITTSBURGH AREA (Mt. Lebanon) • PORTLAND, ORE. ROCHESTER • ROCKFORD • SAN FRANCISCO AREA (Berkeley) SEATTLE • ST. LOUIS • TULSA • WORCESTER**
IN CANADA: Vickers-Sperry of Canada, Ltd., Toronto and Montreal

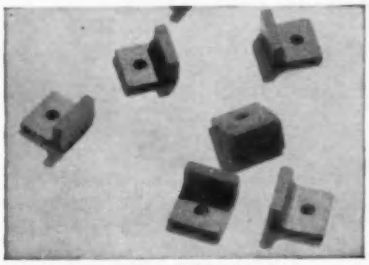
ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921



C-D-F MACHINES TO CLOSE TOLERANCES.
Great accuracy is required to furnish ball bearing race retainers made from fine weave cotton fabric Dilecto rolled laminated plastic tubing. When plastics can do a better job than other materials, come to C-D-F for technical and production help.



C-D-F PIONEERED IN POST-FORMING of laminated plastics. This technique gives you stronger, more versatile insulating parts with lower costs. This aircraft channel strip is an example of simple post-forming.

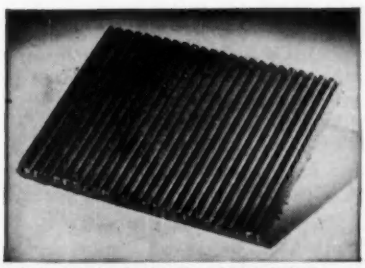


C-D-F DOES THE UNUSUAL. These rubbing blocks are made from fine-weave cotton cloth Dilecto molded *tubing* that has been pierced and cut. The part gains in mechanical strength — the product gets longer service life.

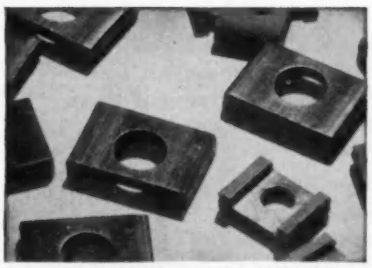


C-D-F SPECIALIZES IN AUTOMATIC SCREW MACHINING of plastic components. These breaker arm bushings are made from Dilecto paper base rolled tubing on high speed machines by men who know and use cost saving methods.

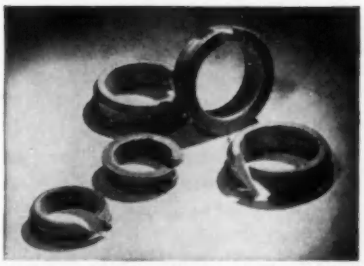
Yes, C-D-F is a big reliable source for fabricated plastics!



C-D-F SERVES MANY INDUSTRIES with fabricated specialties. A great amount is concentrated in the automotive and allied fields. This aircraft part has a corrugated surface on a strong woven asbestos laminated base.



C-D-F IS A PUNCHING SPECIALIST on these starter solenoid insulators. This is XX-26 Dilecto molded channel strip, pierced and punched to length. Special C-D-F punching grades give you lower costs, faster assembly, fewer rejects.



C-D-F COMES UP WITH THE ANSWERS to insulating problems. These unique snap-in grommets are easy to insert, spring out and hold tight. Write for samples. The chances are that C-D-F is already making the answer to your problem.

See our general catalog in Sweet's Design File for more technical data, the address and telephone number of your nearest C-D-F sales engineer. Also, write for detailed information, samples, or send us your print for quotation.

C D F

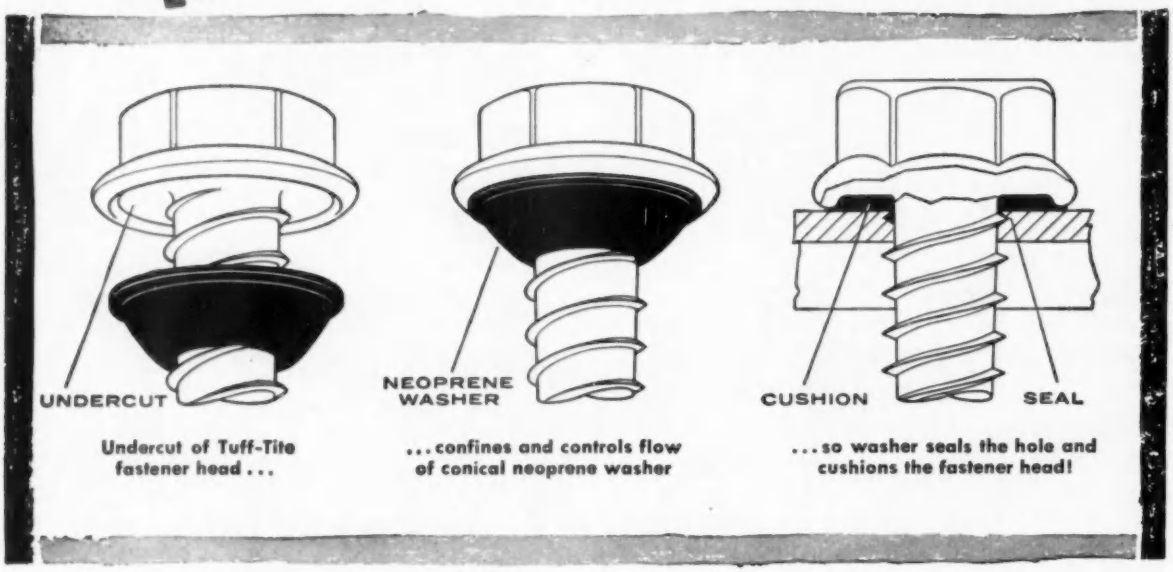
CONTINENTAL-DIAMOND FIBRE

A SUBSIDIARY OF THE Budd COMPANY • NEWARK 2, DEL.



For better products

LEAKPROOF...CUSHIONED TUFF-TITE® FASTENERS



Undercut of Tuff-Tite fastener head . . .

. . . confines and controls flow of conical neoprene washer

. . . so washer seals the hole and cushions the fastener head!

Now you can • prevent leaks at fastener holes
• protect fine finishes from fastener damage
• stop vibration noises and squeaks

It's the combination of undercut head design and tough, conically shaped neoprene washer that makes Tuff-Tite fasteners work. The undercut helps confine and control spread of the neoprene washer as it is compressed. The washer's conical shape causes it to flow into top threads and seal the fastener hole.

Tuff-Tite fasteners won't mar fine finishes and they stop vibration noises and squeaks because the neoprene washer spreads itself completely between fastener head and surface. The washer actually cushions the fastener and prevents metal-to-metal contact.



Leakproof, non-marring, shock and squeak absorbing! If you need these fastening advantages, you need National Tuff-Tite fasteners. Write for the Tuff-Tite fastener folder describing this line in detail.

THE NATIONAL SCREW & MFG. COMPANY
CLEVELAND 4, OHIO
Pacific Coast: National Screw & Mfg. Co. of Cal.
3423 South Garfield Ave., Los Angeles 22, Cal.

Tuff-Tite fastener facts

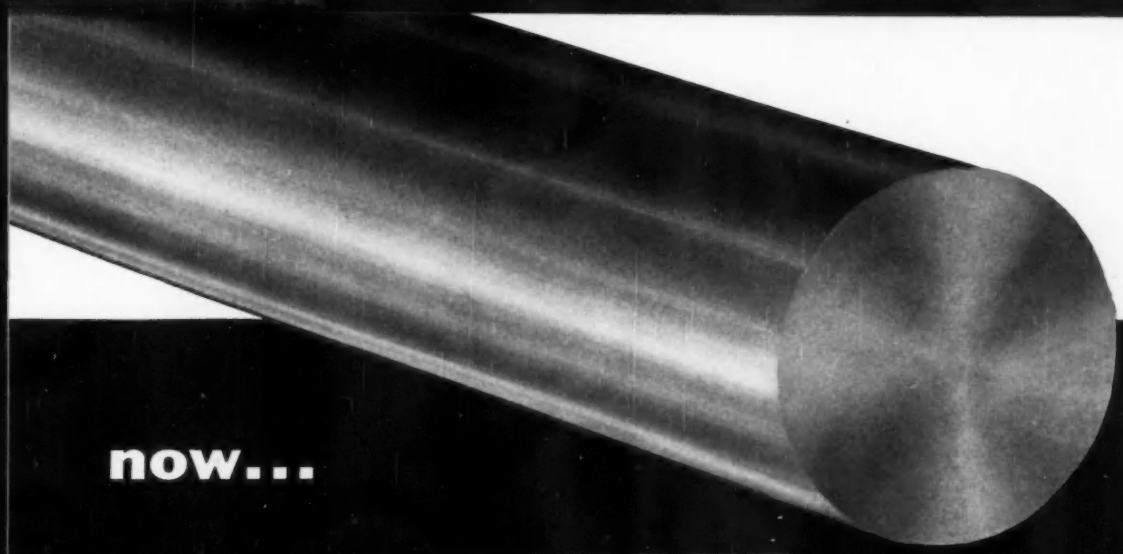
Standard National Tuff-Tite fasteners are available in hexagonal, pan, round and truss head styles for screw diameters No. 6 to ⅜" inclusive . . . maximum over-all length 1½". Standard fastener types are wood screws, self-tapping screws, thread cutting screws, machine screws and stove bolts. Tuff-Tite fasteners are pre-assembled with neoprene washers.

Washers are molded of neoprene which has a durometer hardness of 85 to 95.

Write for information on *special* Tuff-Tite fasteners.

National PRODUCTS

Fasteners  **Hodell Chains**  **Chester Hoists** 



now...

we've put COPPER into STRESSPROOF® steel bars



and the pennies you save add up to dollars!

New Copper Controlled Chemistry improves machinability, gives added wear resistance, and resists corrosion

Production increases by as much as 15% to 50% have been achieved in customer tests comparing STRESSPROOF with and without copper.

The controlled addition of copper to the STRESSPROOF chemistry improves machinability, gives added wear resistance, and resists corrosion. In addition, yield strength is guaranteed . . . 100,000 p.s.i. in sizes through 2" and 90,000 p.s.i. in sizes over 2"—*and* STRESSPROOF requires no heat treating.

JUST PUBLISHED: A new engineering report, "The Effect of Copper, Abnormally Heavy Drafts, Furnace Treatment and Die Practice on STRESSPROOF Steel Bars." Copies are available on request.



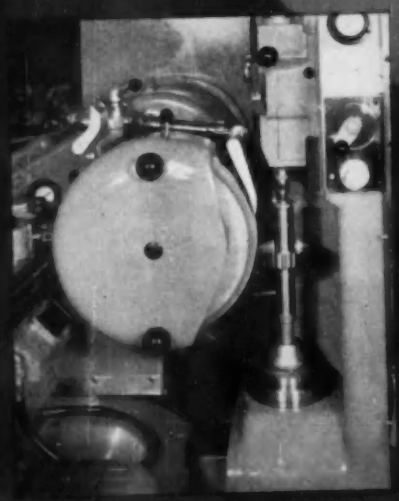


La Salle **STEEL CO.**

1438 150th Street, Hammond, Indiana

Gear Grinding

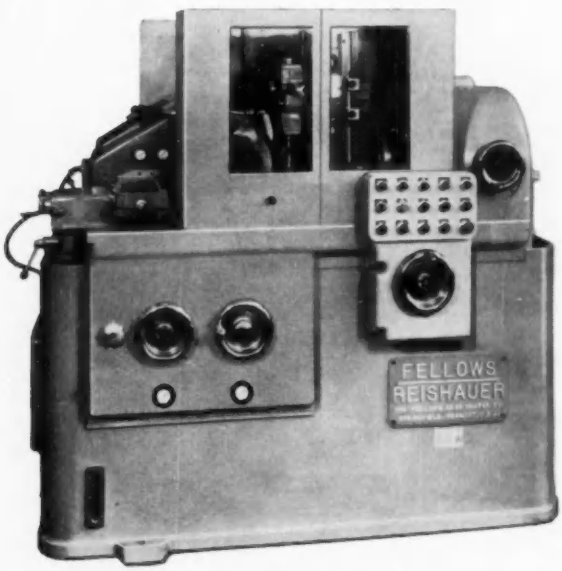
and



THE
PRECISION
LINE

Accuracy
Production Speed...

a cost saving combination.



FELLOWS-REISHAUER
Gear Grinding Machine

American-made by Fellows

Under license from the Reishauer Tool Works Ltd., Zurich, Switzerland, Fellows now manufactures the precision No. 12 Fellows-Reishauer Gear Grinding Machine.

An emery wheel, on which a helix has been developed, generates the gear tooth shape. The tooth section of the wheel is usually that of the basic involute rack. As the wheel turns in harmony with the work while the work passes axially by the wheel, an involute is generated.

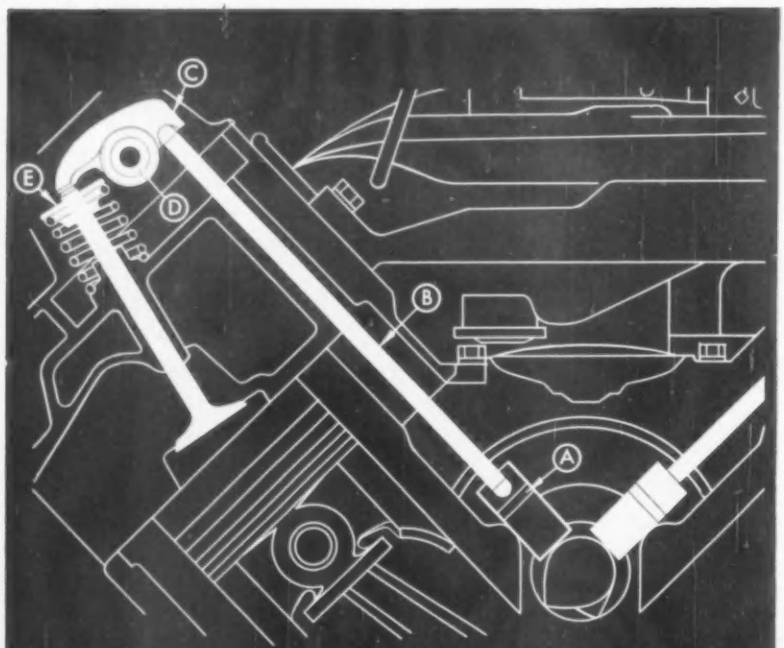
Grinding is done in both directions of travel of the work-slide. Simple, fast machine set-up permits the economical grinding of single piece lots as well as the long production runs.

For grinding spur and helical gears up to 12" O.D. and 6¾" face width, the American-made Fellows-Reishauer is outstanding for combined speed and accuracy. Ask your Fellows representative about it.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

Fellows *Gear Production Equipment*

For all engines - - -



Chicago valve train parts in a typical V-8 automotive engine: (A) Hydraulic tappet, (B) push rod, (C) rocker arm, (D) rocker shaft, (E) valve spring retainer.

Passenger cars



Trucks



Tractors



Diesels



Aircraft



Everything you need in valve gear

from CHICAGO

Here at Chicago you'll find a single source for everything you need in valve gear. These specialized facilities are solving problems and saving money for leading engine manufacturers . . . and can do the same for you.

Design and Engineering—at Chicago you'll find valve gear engineering experience in depth . . . men who understand your problems and will work with your engineering staff in designing cam shafts and complete valve gear assemblies for any type of engine.

Manufacturing—Chicago is a leading manufacturer of valve train parts. Our complete line includes precision-made hydraulic and mechanical tappets; push rods in both lightweight tubular and solid styles; valve adjusting screws including new self-locking screws that cut assembly costs; valve spring retainers; rocker arms and rocker shafts.

Testing—we have complete laboratory and engine testing facilities.

For the full story of how we can serve you, write our Tappet Division.

THE CHICAGO SCREW COMPANY

ESTABLISHED 1872 • DIVISION OF STANDARD SCREW COMPANY

2701 WASHINGTON BOULEVARD, BELLWOOD, ILLINOIS

XXIII

This is the twenty-third of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Annealing: Its Uses with Alloy Steels

Broadly speaking, the primary purpose of annealing is to soften steel and make it more workable. Annealing, as applied to alloy steels, may be defined as a process that heats above, and furnace-cools through, the critical range at a controlled, specified rate of speed; or that heats to a point within, and furnace-cools to a point below, the critical range. In either case, the choice depends upon the structure and maximum hardness desired.

The first method produces a lamellar pearlitic structure, while the second creates a spheroidized condition. These will be discussed separately in the following paragraphs:

(1) *Lamellar pearlitic structure.* It should be mentioned at once that this structure can be obtained both as described above and by a modified method known as isothermal annealing. In the isothermal process, the steel is heated above the critical temperature (austenitized), then transformed at a predetermined temperature, which depends upon the analysis. This operation requires two furnaces or salt baths —one for austenitizing, one for transformation.

Lamellar pearlitic structures are generally associated with machinability in carbon ranges from 0.20 to 0.60 pct, provided the hardness does not exceed the optimum maximum Brinell numeral. This is especially true where critical tooling is involved. It is a very versatile structure, as it gives best results in such operations as broaching, tapping, threading, deep drilling, boring, milling, and tooling as applied on single- and multiple-spindle bar automatic machines.

(2) *Spheroidized structure.* There are two general fields of use for this type of structure when alloy steels are employed. In the low and medium carbon ranges, spheroidization is necessary for cold-shaping operations, such as heading, extruding, drawing. In the higher carbon ranges (over 0.60 pct), it is mandatory where machining is involved, because it tends to lower the hardness of the steel.

As noted elsewhere in this discussion, both lamellar pearlitic and spheroidized structures can be created through annealing. If you care for more details about these and other uses of annealing, and the results to be expected, by all means consult with our technical staff. Bethlehem metallurgists will gladly help you work out any problems. And when you are ready for new supplies of alloy steels, Bethlehem can offer the full range of AISI standard grades, as well as special-analysis steels and all carbon grades.

If you would like reprints of this series of advertisements from No. I through No. XX, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The first 20 subjects in the series are now available in a handy 36-page booklet, and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

REDUCE CRANKSHAFT VIBRATION

. . . in Diesel Engines



with a HOUDAILLE TORSIONAL VIBRATION DAMPER



A Inertia mass or flywheel
B High viscosity synthetic fluid
C Hermetically sealed housing

THE SHEARING ACTION of highly viscous fluid, used exclusively in the Houdaille damper, makes it the *most practical, most efficient* method of reducing torsional vibration in diesel engine crankshafts. A true damper and not a detuning device, it is effective across the full range of engine criticals. To diesel and gasoline engine manufacturers, it offers greater horsepower and speed . . . to diesel engine users it means smoother operation, longer life and less maintenance.

OTHER OUTSTANDING HOUDAILLE DEVELOPMENTS INCLUDE...



HOUDAILLE FRICTION SNUBBERS

Designed for use on freight and passenger car trucks, to control excess vertical movement and help protect lading on uneven tracks and curves.



HOUDAILLE ROTARY SHOCK ABSORBERS

Engineered and built to outlast and outperform linear type shock absorbers. Available in a wide range of designs, for original equipment or replacement use on railway passenger cars, motor trucks, buses, tractors and farm equipment, and other heavy duty vehicles. Exclusive external valve adjustment . . . easy to service without being removed.

EXPERIENCED ENGINEERS



and precision production facilities at Houdaille are at your service for any application involving hydraulics. Write Department AI for specifications and performance data on Torsional Vibration Dampers, Rotary Shock Absorbers or Friction Snubbers

HOUDAILLE INDUSTRIES, INC.

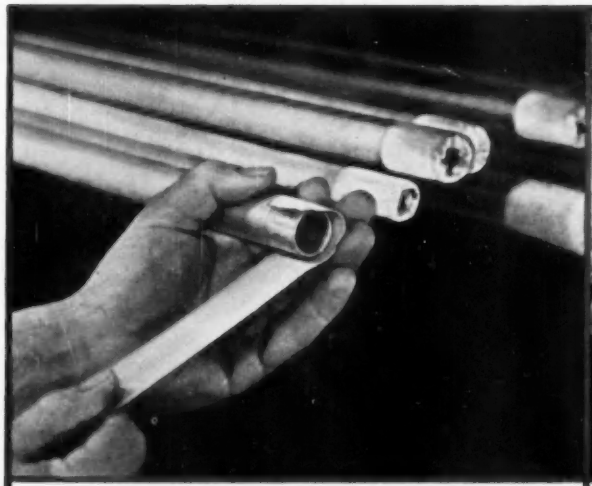
BUFFALO HYDRAULICS DIVISION

537 East Delavan Avenue Buffalo 11, N. Y.

LOW-COST WAY TO PROTECTION AND LONGER WEAR—

Wrap it in Polyken Tape

See how the right tape can save you many times its cost



Protection for newly threaded pipes. *Polyken* Tape prevents costly nicks during handling, binning, packing and shipping. Pulls off clean and quick.



Work gloves last longer. Simple precautions with *Polyken* Tape help to resist abrasion . . . add up to *many* times the wear. Worthwhile savings can result when this is made standard plant procedure.

Do your handling costs keep going up without anything to show for the increase?

Better investigate *Polyken* cloth-backed tapes—in the economy-utility line.

Here, in one low-cost package, you will find all the sticking power . . . all the tensile strength . . . all the wear and tear resistance you need.

The important thing is, you won't be paying for qualities you *don't* need. And you'll still be getting the excellent protection you pay for.

Send for a complete data file on *Polyken* Tapes to "wrap up" the solution to your handling problems.

Polyken®

INDUSTRIAL TAPES

THE KENDALL COMPANY

Polyken Sales Division

MAIL THIS COUPON NOW!

Polyken, Dept. AI-1
309 West Jackson Blvd., Chicago 6, Illinois

Please send me complete data file on physical properties of Polyken Economy-Utility Tapes.

Name_____

Company_____

Street Address_____

City_____ Zone____ State_____

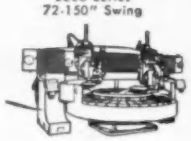
NEW Frauenthal 1200 Series single spindle vertical precision grinders



Bird's-eye view of a new Frauenthal 1200 Series (belt-driven) single spindle, vertical precision grinder. These versatile machines are designed to meet a broad range of present requirements . . . are readily adaptable to future requirements.

F PRECISION PRODUCTION VERSATILITY

2200 Series
72-150" Swing



1800 Series
60-72-84" Swing

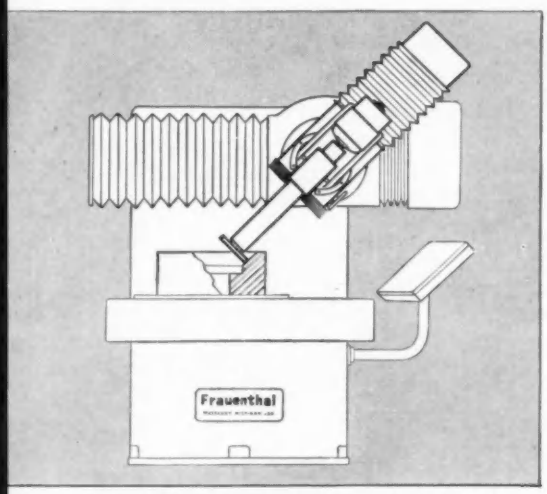


3100 Series
60-72-84" Swing

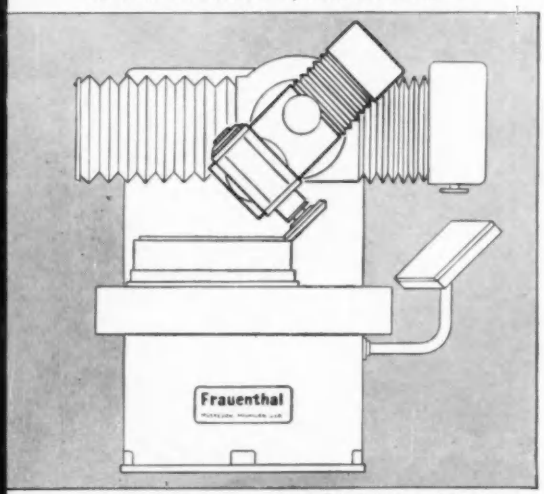


creatively engineered

...accuracy to .000100" at spindle nose



Frauenthal belt-driven Model 1224B and 1236B single spindle, vertical precision grinders have an extreme angle setting of compound at 45°. Versatility such as this permits angle, internal, external and face grinding to millionths-of-an-inch related tolerances.



Frauenthal direct-connected Models 1224D and 1236D are ideal for rotary surface grinding, O.D. surface and angular approach grinding operations. A variety of grinding spindle positions is possible with this head arrangement.

assures uniform, super-precision part after part!

Super-precision is the natural result of overall Frauenthal single spindle, vertical precision grinder rigidity; of proven performance . . . and *continuous* application of advanced grinding techniques.

These new Frauenthal 1200 Series machines are available with choice of belt-driven or direct-connected grinding spindles. Machines with either spindle arrangement are offered with 24" dia. tables x 36" swing and 36" dia. tables x 48" swing capacities inside splash guards. Additional swing can be obtained by removing guards.

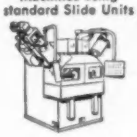
Write for free Bulletin



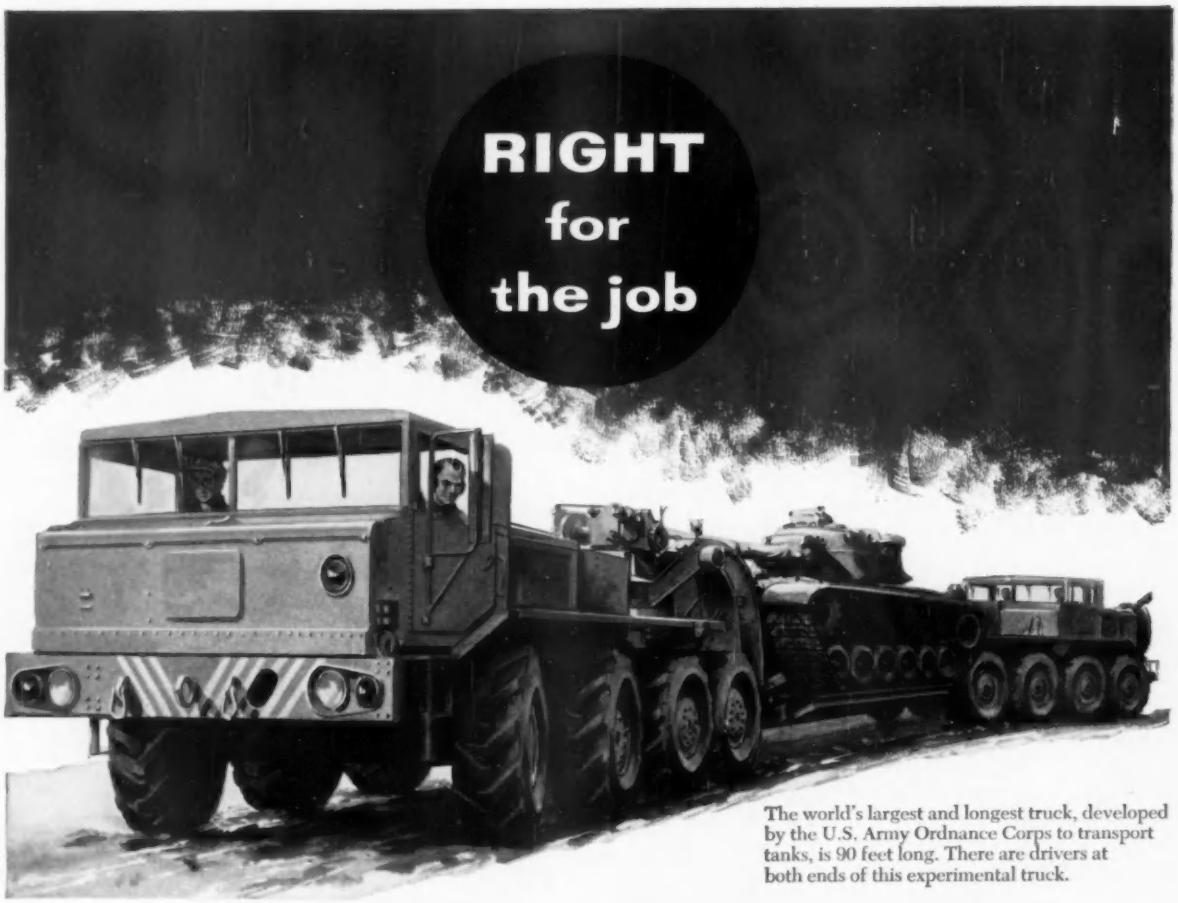
1200 Series 36-48" Swing



Special Grinding Machines using standard Slide Units



Frauenthal Division
THE KAYDON ENGINEERING CORP.
MUSKEGON, MICHIGAN, U. S. A.



The world's largest and longest truck, developed by the U.S. Army Ordnance Corps to transport tanks, is 90 feet long. There are drivers at both ends of this experimental truck.

...as EVANS HEATERS

are right for trucks !

You can't transport army tanks on an ordinary vehicle nor can you heat a truck properly with a heater built for passenger cars. Both jobs require specially designed equipment.

There's nothing quite as right for heating trucks as Evans Heaters, because *they're* built for trucks.

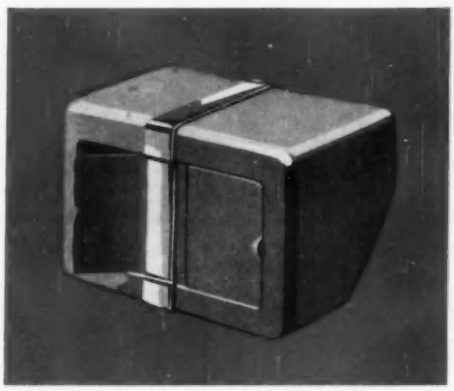
The materials that go into Evans Truck Heaters are as dependable as the materials used in the truck itself. Each Evans Heater is custom designed for the job it has to do. In that way, you *know* you have a heater that's *right for the job!*

For engineering service or a catalog of Evans Heaters, write Evans Products Company, Department P-9, Plymouth, Michigan.

Regional Representative Cleveland, Frank A. Chase
Chicago, R. A. Lennox Co., Inc. • Detroit, Chas. F. Murray Sales Co.
Allentown, Pa., P. R. Weidner

EVANS HEATERS ARE RIGHT FOR TRUCKS BECAUSE THEY'RE BUILT FOR TRUCKS

EVANS PRODUCTS COMPANY ALSO PRODUCES:
railroad loading equipment; bicycles and velocipedes; Evaneer fir plywood; fir lumber; Evanite battery separators and Evanite hardboard.



MACHINING PERFECTION always starts with the right steel

Pick exactly the right steel for any job from J & L's complete cold finished line



"Manufacturer saves three ways with J & L 1113 Bessemer steel"

This friction shaft part for a textile machine was converted to J&L "1113" Bessemer steel with these results:

- Time cycle reduced 20%
- Surface finish improved 20%
- Tool life increased 100%

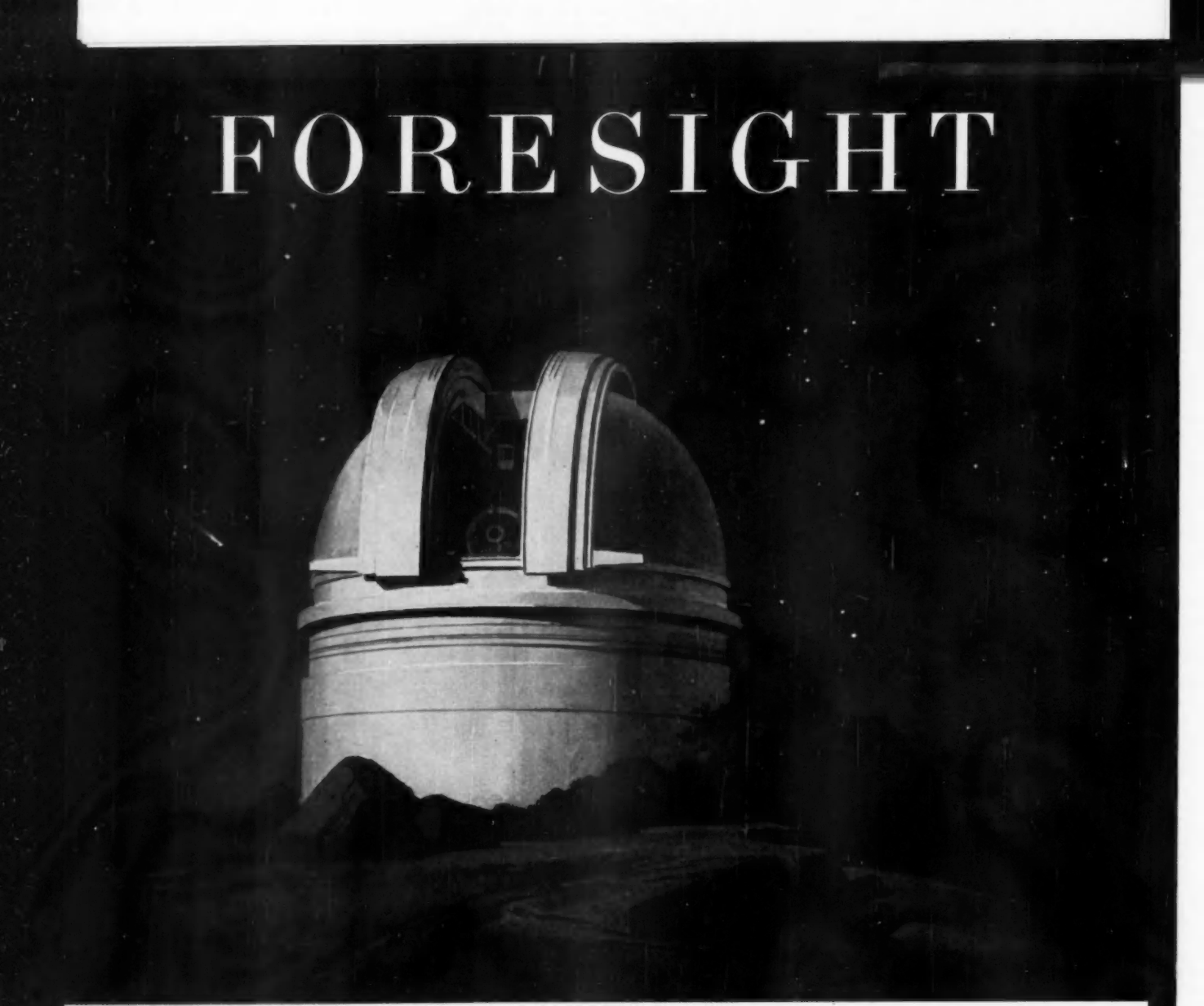
Due to these savings, manufacturer is now using J&L "1113" steels for other applications. You can get similar savings in cutting speeds and tool life. Get facts from your distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

Jones & Laughlin

. . . a great name in steel

FORESIGHT



Planning for tomorrow • Producing for today!

Since the earliest days of the industry, Bendix foresight in product design and development has contributed materially to automotive progress.

For example, Bendix* power braking and power steering, two of the industry's most popular new car features, are the results of years of research and engineering by Bendix specialists in these important fields.

Today Bendix engineers are likewise busy planning and developing new and better products to meet the needs of the years ahead.

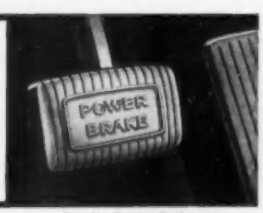
It is because of this foresight the automotive industry looks to Bendix for components that continue to lead in public acceptance and dependable performance.

*REG. U.S. PAT. OFF.

BENDIX PRODUCTS DIVISION **SOUTH BEND** INDIANA

Export Sales: Bendix International Division, 205 East 42nd Street, New York 17, N. Y.

TYPICAL EXAMPLES



Bendix Power Brakes



Bendix Power Steering

Bendix Products Division

Bendix AVIATION CORPORATION

BRAKES • POWER STEERING • POWER BRAKING • CONSTANT VELOCITY UNIVERSAL JOINTS • HYDRAULIC REMOTE CONTROLS

AUTOMOTIVE INDUSTRIES

BUSINESS DEPARTMENT

John C. Hildreth, Jr., Publisher
John F. Pfeffer, Asst. to Publisher
E. H. Miller, Advertising Mgr.
E. W. Hevner, Circulation Mgr.
James Cadagan Asst. Circulation Mgr.

REGIONAL MANAGERS

CHICAGO—William H. Baldwin
—Carl A. Zehner
360 North Michigan Ave.
Chicago 1, Ill.
Phone RAndolph 6-2166

DETROIT—Melvin B. Nylund
1015 Stephenson Bldg.
Detroit 2, Mich.
Phone TRinity 5-2090

PHILADELPHIA and NEW YORK—
Nelson W. Sieber
Chestnut and 56th Sts.
Philadelphia 39, Pa.
Phone SHerwood 8-2000
and
100 East 42nd St.
New York 17, N. Y.
Phone OXford 7-3400

CLEVELAND—Richard P. Keine
930 B. F. Keith Bldg.
Cleveland 15, Ohio
Phone SUperior 1-2860

DALLAS—William J. Smyth
909 Mercantile Securities Bldg.
Dallas 1, Tex.
Phone Riverside 7-1732

TULSA—John W. Sangston
621 Petroleum Bldg.
Tulsa, Okla.
Phone LUther 4-1769

SAN FRANCISCO—Frank W. McKenzie
1355 Market St.
San Francisco 3, Calif.
Phone UNderhill 1-9737

LOS ANGELES—L. H. Jackson
198 S. Alvarado St.
Los Angeles 57, Calif.
Phone DUnkirk 7-4337

●

One of the Publications
Owned by
CHILTON COMPANY

Executive Offices
Chestnut & 56th Sts.
Philadelphia 39, Pa., U.S.A.

Officers and Directors
JOSEPH S. HILDRETH, *Chairman of the Board*
G. C. BUZBY, *President*
Vice Presidents
P. M. FAHRENDORF
HARRY V. DUFFY
L. V. ROWLANDS
GEORGE T. HOOK
ROBERT E. McKENNA
Treasurer—WILLIAM H. VALLAR
Secretary—JOHN BLAIR MOFFETT
MAURICE E. COX
FRANK P. TIGHE
IRVING E. HAND
EVERIT B. TERHUNE, JR.
JOHN C. HILDRETH, JR.
RUSSELL W. CASE, JR.

STANLEY APPLEBY—*Comptroller*

High Spots of This Issue

▼ Machine Tools and Production Equipment

Published annually by AUTOMOTIVE INDUSTRIES, this comprehensive roundup covers equipment and products which have applications in plants producing passenger cars, trucks, buses, aircraft, road-building equipment, powered farm equipment, engines, or other components and parts. This issue makes available a handy guidebook for planning and selecting equipment for future production. In it the reader will find all items conveniently arranged in seven sections—Machine Tools, Forming Equipment, Material Handling Equipment, Quality Control, Welding Equipment, and Specialized Equipment. The last classification includes die casting, injection molding, controls, components, and others. Page 73.

▼ The New Edsel

This article contains a detailed description of America's newest passenger car, including all its distinctive styling and design features. Covered here are such components as the electric "Teletouch" automatic transmission selector system, new self-adjusting brakes, a recirculating ball-and-nut-type steering gear, and two new engines. Page 66.

▼ Metals Report

Continuing his penetrating monthly analysis of the metals market, William F. Boericke, metals research specialist for Hayden Stone & Co., foresees an upturn in the demand for steel and reports on copper, lead, zinc, and aluminum prospects for the coming quarter. Page 186.

▼ Trends in the Construction Equipment Industry

Besides making a broad survey of trends in the construction machinery field, the author of this article discusses the effects that the Federal roadbuilding program is having on the plans of construction equipment manufacturers. Page 196.

Complete Table of Contents, Page 3
Automotive and Aviation News, Page 55

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES
• BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY •
PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT
SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT
ENGINEERING • PRODUCTION • MANAGEMENT

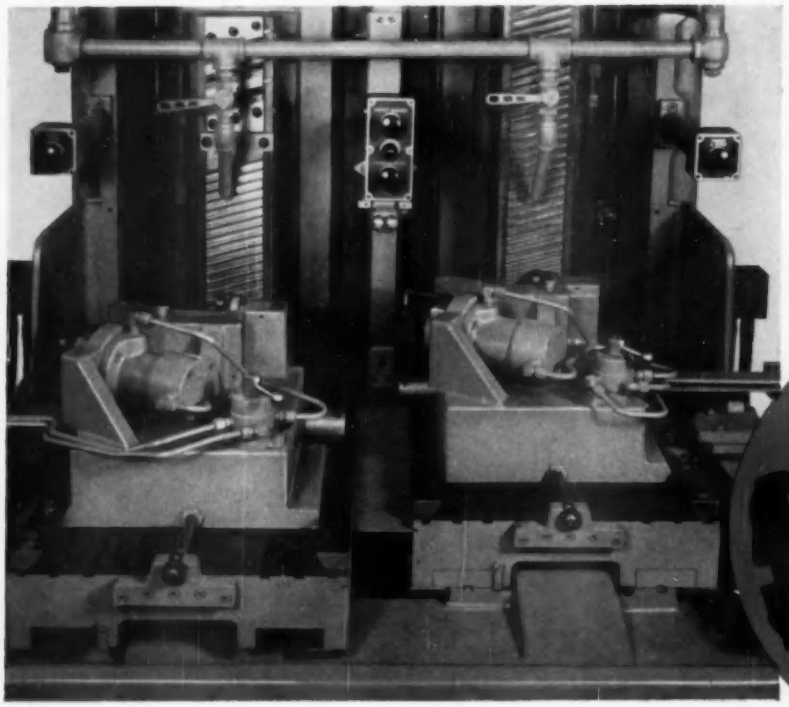
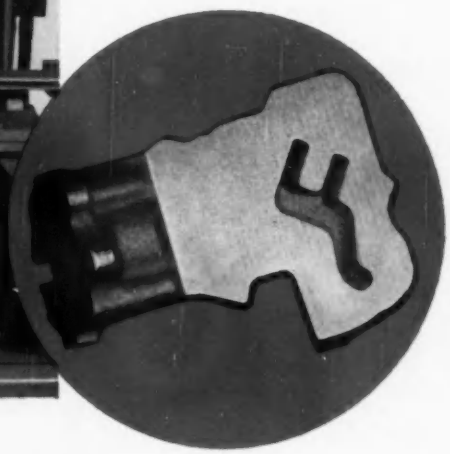


Photo of part broached on the all-Cincinnati equipment illustrated here.

Production data:

Part name	Servo body
Material	Cast iron
Operation	Broach large flat surface
Stock removal	.100
Production	278 per hour
Machine	CINCINNATI No. 10-66 Duplex Vertical Hydro-Broach



CINCINNATI DUPLEX VERTICAL

. . . Broaches Smooth Accurate Surface on Servo Valve Bodies



Specifications for servo bodies are tough. For example, the large joint face must be surface-plate flat, and machined at a high rate of production. To meet these requirements, Cincinnati Engineering Service Specialists recommended broaching, and tooled up a CINCINNATI® No. 10-66 Duplex Vertical Hydro-Broach for the job. Two hydraulically operated fixtures help the operator maintain high production. The machine's smooth ram traverse, square gibbed ways, automatic pressure lubrication and other features take care of the accuracy of flatness requirement. ¶CINCINNATI Hydro-Broach Machines and Cincinnati Engineering Service are a team that just can't be beat for modern, low-cost production methods and equipment. Why not take advantage of this team? Send blueprint and details. Meanwhile, complete information on CINCINNATI Duplex Vertical Hydro-Broach Machines may be obtained by writing for catalog No. M-1848. Brief specs in Sweet's Machine Tool File.

Special Machine Tool Division
THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO

CINCINNATI

MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • SPECIAL MACHINE TOOLS • METAL FORMING MACHINES • HARDENING MACHINES • CUTTING FLUID • GRINDING WHEELS

News

OF THE AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 117, No. 5 **September 1, 1957**

Edsel, First of 1958 Models, Makes Public Bow September 4

Edsel—newest American passenger car and first of the 1958 models—will make its first public appearance Sept. 4 in dealer showrooms. The press saw the new car Aug. 27 at a preview in Dearborn, Mich. (See p. 66 of this issue for a detailed engineering story on the complete 1958 Edsel line.)

Ford Motor Co. has spent some $250 million and three years' preparation on its new medium-priced car. Tooling, plants and facilities accounted for 60 per cent of the total, with overhead and launching expenses taking the rest. Edsel Div. has set a production goal of 200,000 units for its first year and expects a field inventory of 20,000 cars at some 1200 dealers when the public gets its first glance at the new car.

Pricewise, Edsel will span the medium-price field. The Ranger two-door sedan will cost less than some Ford models, while a well-equipped Citation will reach into the Lincoln price bracket.



NORTH AMERICAN TO BUILD JET UTILITY AIRCRAFT

An artist's drawing shows the 500-mph Sabre Liner jet utility airplane to be built at company expense by North American Aviation in answer to a military requirement for such an aircraft. Engine nacelles at the wing roots have been eliminated, and engine pods moved to the aft fuselage. Powered by two General Electric J-85 turbojets, the plane is reported capable of flying halfway across the continent without refueling.

All-Synthetic Truck Tire Is Developed for the Army

An all synthetic, heavy duty truck tire that may result in substantial savings in the defense program and free the country from its dependence on natural rubber has been developed for the Army.

The tires are made of butyl, a synthetic rubber created from oil refinery gases. They were perfected after more than three years of research by the Pennsylvania Tire Co. and the Esso Research and Engineering Co., the inventors of butyl.

At the present time, all mass-produced truck tires are being made with a combination of general-purpose synthetic rubber and natural rubber, or 100 per cent natural rubber.

Esso officials say that the tires were made from a synthetic rubber available in commercial quantities. They report that ordnance tests under gruelling cross-country and highway conditions had shown the new butyl tires to be at least equal or superior to military tires now being manufactured.

The new tire's success is attributed in part to improved modifying agents which lessen heat generation, a serious problem in recent years because of higher speeds and heavier load.

The new tire is being produced in size 9.00x20—the most widely used truck type in the Army. The research work was carried out under Army Ordnance contracts.

Improvement Plans In Use At Chrysler Parts Plant

Two manufacturing improvement plans, suggested by employes, are in use at the Chrysler Eight Mile parts and equipment plant in Detroit. One plan utilizes a lifting mechanism for removing production pieces from the die in a stamping press. A hand-operated lever loosens the piece for easy removal.

The other plan calls for a lightweight metal platform next to stamping machines to raise parts and make them more accessible to operators. Because of the number of similar operations at the plant, according to Chrysler, the two suggestions add greatly to plant efficiency.

NEWS AUTOMOTIVE AND AVIATION



ELECTRIC BIKE IS HANDY FOR SUBURBAN TRAVEL

This economical electric vehicle operates on one, two, or three standard 100 AH automotive batteries in parallel that reportedly can be recharged by plugging into any light socket. Motor is a six-volt series, d-c unit with sealed ball bearings, and charger is a continuous-duty selenium type 30-amp rate with timer for automatic shut-off. The versatile vehicle is manufactured by Electromite, Inc. of Marianna, Fla.

Air Suspension's Near Future Brighter for Trucks than Cars

Although some makes will offer air suspension in 1958, it does not seem likely that the new system will replace conventional springs on very many passenger cars for at least another year. Ford Motor Co. and General Motors cars will have air suspension available sometime during the coming year, but it may not be a complete system—front and back—in every case, and it will be an extra-cost option on all but Cadillac's Brougham. Chrysler, of course, will stick with its Torsion-Aire ride, introduced a year ago, and the independents do not appear to be ready with air suspension.

Commercial vehicles, however, present an entirely different picture. Air suspension already has proved satisfactory on buses. GMC has built more than 12,000 coaches with air-ride since March, 1953. As in the case of passenger cars, a more comfortable ride is a major selling point, but air suspension bears certain other advantages for buses and trucks that do not show up in passenger car use. Consequently, truck and bus operators might feel more readily disposed to pay the premium than passenger car buyers.

W. A. Duvall, Greyhound Corp. vice president in charge of equipment and maintenance, points out that Greyhound's air suspension buses have had no extensive body or frame breakage, window or window sash trouble or emergency door jamming that formerly could be traced to high frequency vibration through steel spring suspension. Greyhound has some 2300 air suspension coaches in operation, another 500 on order.

The one problem of any significance which Greyhound encountered, according to Mr. Duvall, was build-up of ozone inside the rubberized air bellows of 1953 and 1954 model Scenicruisers. This was remedied, both by Greyhound on fleet buses and by GMC on later units, by changing the position of the air intake.

GMC's first production trucks with air suspension have been in operation since last May in Kansas City. Early results have been excellent, according to GMC, and are following the same pattern as the first buses. The trucks, of course, have the advantage of operating experience gained through the buses. GMC expects to expand air suspension to more truck models during the coming year.

Maintenance and replacement, two big cost items in fleet operations, are reported to be cut considerably with air suspension, particularly since GMC's rubber-mounted system needs no lubrication. This is a factor that probably would have little bearing on a passenger car purchaser's decision, yet Greyhound, with nearly one billion miles on its air suspension coaches, considers the lubrication savings a paramount economy.

Other advantages peculiar to fleet operations are less damage to cargo through vibration, smoother ride when light, no "listing" with load imbalance, and increased cubic capacity of the trailer because of a lower fifth wheel.

Progress Recorded in Drive To Check Exhaust Pollutants

The automobile industry reported last month on the progress it has made toward finding a means of eliminating unnecessary emission of hydrocarbons and other pollutants from vehicle exhaust. The joint report of the cooperative work was made at the SAE National West Coast Meeting in Seattle through eight technical papers.

Briefly stated, the Vehicle Products Subcommittee of the AMA reported that work to date has been along three basic lines—measurement and analysis of exhaust gases, control through induction systems, and control through an exhaust system. Work will continue along all three lines.

Ford Motor Co. engineers presented two papers on analysis, one by continuous air flow measurement, the other by use of an electronic integrator. A third paper, presented by a DuPont engineer, covered grab sampling as a means of measurement.

Although work to date has shown induction systems to be more efficient in checking pollutant emissions, the engineers feel that some sort of exhaust system offers more promise. A report on work being done by Ford Motor Co. on an exhaust catalyst of vanadium oxide was perhaps the most encouraging of the group.

Timken Increases Capacities Of Most Roller Bearing Sizes

Capacity ratings of most series of Timken roller bearings have been increased, some as much as 39 per cent in a few instances, but by approximately 10 per cent in most cases. The increased ratings are said to make it possible to use smaller bearings in many applications.

A multi-million dollar research building program is presently underway at Timken Roller Bearing Co., including a new metallurgical laboratory and a new physical laboratory. Continued refinements in the manufacture of tapered roller bearings will be carried on there.

New Aviation Magazine Planned By Chilton; AI Coverage Same

The first trade magazine devoted exclusively to the manufacture of aircraft, missiles, rockets, and component parts will be published by Chilton Co., beginning January, 1958.

Titled *Aircraft and Missiles Manufacturing*, the new monthly publication will concentrate its circulation among production, design, and purchasing executives. In addition, it will be directed to selected military and Government personnel. Editorial content will emphasize production techniques and engineering for manufacturing.

John C. Hildreth, Jr., has been named publisher of the new magazine, and John F. Pfeffer has been made assistant to the publisher. The two appointees hold the same posts—and will retain them — on AUTOMOTIVE INDUSTRIES. AI coverage of aviation engineering and production developments will continue unchanged.

The decision to launch the new magazine was made after intensive studies by an independent research organization showed an unfilled need for one devoted to aircraft and missiles manufacturing. It is the fourth publication to be added in the last year and a half by Chilton Co. and brings the company's total of trade magazines to 16; it is also the first to be founded by Chilton in recent years.

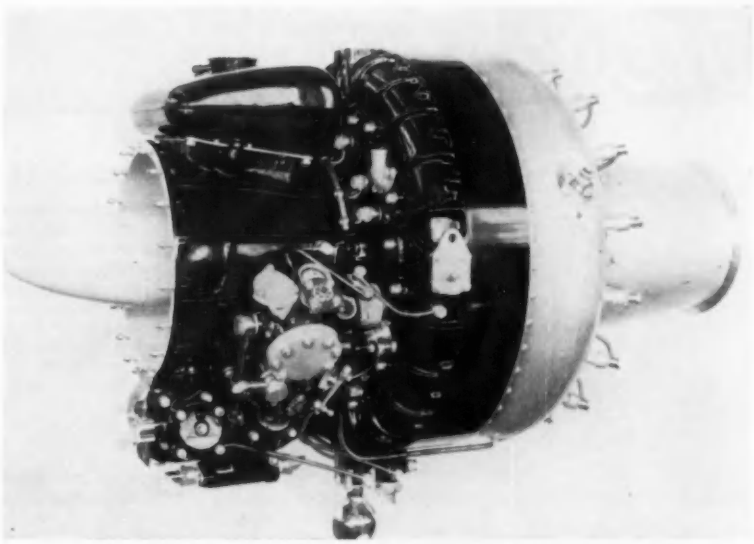
Millionth Export Vehicle Shipped by Ford of Canada

Ford Motor Co. of Canada has shipped to South Africa the millionth motor vehicle it has made for export. Thirty per cent of the 3.4 million cars and trucks it has produced since its inception in 1904 have been shipped to overseas markets and have pumped $1.35 billion into the Canadian economy.

The millionth unit is a 1957 Ford Fairlane. Along with 47 other cars, it is being shipped knocked-down to the company's wholly-owned subsidiary—Ford Motor Co. of South Africa.

Fruehauf Sales, Earnings Fall In First Half As Volume Drops

Fruehauf Trailer Co. reported losses in net sales and earnings in the first half of 1957 as volume declined in what the company calls "intense competition for available business." Sales totaled $120,836,314, down from last year's $153,565,849. Earnings were $2,206,877, compared with $5,287,066 a year ago.



COMPACT FIAT TURBOJET WEIGHS ONLY 194 LB.

Fiat turbojet, the 4002.001, rated at 716-lb maximum thrust, has an overall length of under 35 in. This is made possible by a reverse-flow annular combustion chamber with 16 flame tubes. The unit weighs only 194 lb, giving a weight-to-thrust ratio of 0.27 lb/lb t. It has a diameter of 22.5 in., and a frontal area of 2.8 sq ft.

Work Begins on Allis-Chalmers $3.25 Million Research Facility

Construction is under way at Allis-Chalmers' $3.25 million research and engineering laboratory at Harvey, Ill. The project is slated for completion next spring. Included in the facilities, being built on 35 acres, will be a central engineering building, engine and material handling product development laboratory, experimental machine shop, metallurgical laboratory, engine test wing with 32 dynamometers, and a proving ground for material handling equipment.

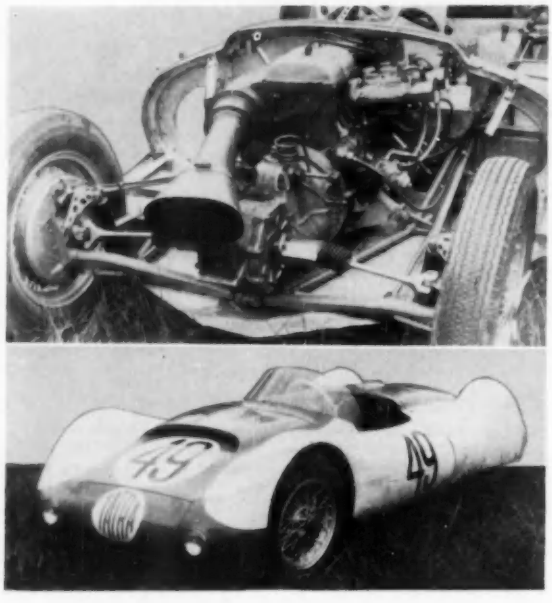
Space vacated by these departments will be used for the Harvey Works administration and production departments. The Harvey Works produce gasoline, Diesel, natural gas and LP gas engines and power units; marine Diesel engines; electric generator sets; and material handling equipment.



RUSSIAN AMBULANCE HAS FOUR-WHEEL DRIVE

Russian cross-country ambulance, the cab-over-engine UAZ-450-A, uses the four-wheel drive chassis of the jeep-like GAZ-69. Side-valve engine of 129.3 cu in. displacement develops 55 bhp at 3600 rpm; it drives through a three-speed transmission and two-speed transfer case, providing six forward and two reverse ratios.

NEWS AUTOMOTIVE AND AVIATION



SPORTS CAR

Czechoslovak sports car, Tatra T605, uses exhaust to cool rear-mounted, two-cylinder engine. Exhaust pipe is centered in flared ejector tube of engine cowling, and this acts as a venturi to suck air through built-in ducting past the finned barrels. The 38.7 cu in. engine has twin carburetors and 12.5 to 1 compression. It runs on alcohol and develops 50 bhp at 7000 rpm. Engine, four-speed transmission, and differential form an integral unit. Wheels are independently suspended by longitudinal torsion bars. Body shell consists of two main stampings that can be quickly detached and lifted off the chassis.

AMC Using New Paint Technique For Improved Primer Coverage

American Motors is using a new body-dip painting technique which submerges the car body in a 15,000-gal tank of primer to give complete coverage of all sheet metal, inside and out. One tank already is in operation at AMC's Milwaukee body plant. A second tank, for the company's new 100-in. wheelbase model, will be placed in operation this month (Sept.) at Kenosha.

The AMC dip method, under development for three years, calls for a tank 91 ft long, six ft deep and 7.5 ft wide. The tank contains 15,000 gal of Ferrochrome, a red oxide alkyd fortified with zinc chromate. Ferrochrome is made by Pittsburg Plate Glass Co.

Each body takes about two gal of Ferrochrome. The body enters the tank on an overhead monorail conveyor and is completely immersed at the center of the tank. The operation takes from three to four minutes, and four bodies are in process at the same time.

Before dipping, the body is Bonderized. After the primer dip the body is scuffed and then painted with two coats of enamel. Two additional enamel coats are used if the body is two-tone.

Lincoln, switching to unit body construction with its 1958 models, is said to be using a similar dip system at its new plant in Novi, Mich.

Several European manufacturers, including Volvo, British Motors and Volkswagen, have used forms of body dipping in the past. At British Motors, AMC's Metropolitan is dipped on a rotisserie-like spit.

Monroe Auto Expands Output At Hartwell, Ga. Factory

Monroe Auto Equipment Co. has shipped seven carloads of machinery and equipment to its plant in Hartwell, Ga. to expand production of the company's new Load Leveler shock absorber. The machinery had been stored in the No. 1 plant in Monroe, where some 90 per cent of the company's replacement shock absorbers are made.

Production of the Load Leveler began last May at Hartwell, but a strike in Monroe delayed shipment of the machinery. The Hartwell plant also is manufacturing private brand shock absorbers and a small percentage of Monroe shock absorbers used in Southeastern automobile assembly plants. Two other plants, in Monroe and Hillsdale, Mich., are continuing to produce sway bars and tractor seats.

Seat Belts Can Save Lives, Industry Officials Testify

Spokesmen for Ford and General Motors testified before the House Subcommittee on Traffic Safety recently that the use of seat belts can save lives in automobile accidents. But the main problem today, they said, is getting the public to accept and use the precautionary belts.

Ford group vice-president Robert S. McNamara, through testimony read by Alex L. Haynes, said that the use of seat belts in all cars and trucks would reduce the annual highway death rate to 19,000 and the number of serious injuries by half, to no more than 500,000. Mr. Haynes, director of advanced product study at Ford, added that since they became available on all Ford cars and trucks in 1956, seat belts have been installed on 160,000 vehicles at the factory and on another 200,000 at dealers.

Charles A. Chayne, General Motors vice-president in charge of Engineering Staff, said that a GM survey confirmed earlier opinions that public acceptance and demand for seat belts might be extremely small, although tests showed that under many accident conditions occupants of vehicles would benefit if they used belts.

H. K. Porter Co. Acquires 76-Year-Old Forging Firm

H. K. Porter Co., Inc., has acquired Cleveland Hardware and Forging Co., Cleveland, O., manufacturers of drop forgings, automotive and commercial hardware, and die castings. The 76-year-old firm will be known as the Cleveland Div., H. K. Porter Co., Inc.

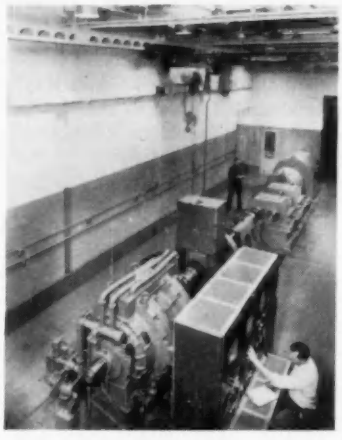
Cleveland Forging produces many specification items for manufacturers of trucks and automobiles, road building equipment, and tools. The concern also produces zinc and aluminum die castings. Sales have amounted to about $7 million a year.

Mack Arranges $136 Million Credit for Instalment Buying

Mack Trucks, Inc., has arranged an open-end credit agreement with 53 banks and 11 insurance companies to provide instalment buying facilities. The $136,422,500 package replaces an $80 million revolving credit agreement set up in 1955 with 48 banks, so that the new plan actually offers $56,422,-500 credit to Mack.

Banks, headed by trustee Bankers Trust Co. of New York, will provide $100,172,500 in credit, and insurance companies, headed by Prudential Insurance Co. of America, will provide the balance.

AI TABLOID



Twin Disc laboratory's dynamometer bay

New Twin Disc Laboratory Has 1,000-Hp Dynamometer

Twin Disc Clutch Co. has completed a new research and test laboratory at the firm's Hydraulic Div. plant in Rockford, Ill. The facility houses the latest testing equipment and includes bridge cranes that can handle machines up to five tons, an assembly and bench work bay where test units and fixtures will be built, and a 1000-hp dynamometer bay.

The most modern piece of equipment is the laboratory's 1000-hp dynamometer, which is designed to deliver its rated output to a test unit at speeds of from 900 to 3000 rpm, and 8000 lb ft of torque at 0 to 900 rpm. A novel feature of the unit is the data readout and control. Input torque is read out on a manually balanced torque indicator; or the torque signal and speed signal are fed into a function plotter which automatically plots input torque vs input speed, or input torque vs speed ratio.

One bay in the laboratory is devoted to clutch research and seal testing. The seal testing machine contains heads where seals may be subjected to any desired conditions. Clutch research is conducted on two Diesel stands, the Diesels providing a means for simulating various field conditions.

Ford Division Sets Record With 1957 Model Production

Ford Div. expects to wind up 1957 model production with approximately 1.6 million passenger cars, an all-time high. Ford built its 1.5 millionth 1957 car in mid-August, passing the 1955 model year record of 1,451,000 units. Ford's 1957 calendar year production through August approached 1,050,000 cars.

Minneapolis-Honeywell Regulator Co. has leased a new plant in Fall River, Mass., for production of a new line of electronic industrial controls.

* * *

Aeroquip Corp. and The Weatherhead Co. have concluded an agreement that permits them to produce and sell certain types of each other's fittings.

* * *

Standard Pressed Steel Co. has organized a new division to produce special stud-type fasteners for conventional and nuclear power plant builders.

* * *

Lockheed Aircraft Corp. has developed a "B" version of its C-130 Hercules propjet cargo-troop carrier.

* * *

Convair Div. of General Dynamics Corp. has placed a $1.1 million order with Eclipse-Pioneer Div. of Bendix Aviation Corp. for PB-20 automatic flight control systems.

* * *

Automotive Gear Div. of Eaton Mfg. Co. is building an addition to its Richmond, Ind., plant. . . . Schrader Div. of Scovill Mfg. Co., Inc., has built a new vulcanizing plant at Cannock, England.

* * *

Westinghouse Electric International Co. has licensed the Belgian concern of Ateliers de Constructions Electriques de Charleroi to produce nuclear reactors developed by Westinghouse.

* * *

German motor vehicle manufacturers shipped 139,876 units to foreign markets in the first quarter of 1957, a 17 per cent rise over the same period last year.

* * *

Chrysler Corp. has begun construction of a sales and service training center at Atlanta, Ga., first of four such centers it will build in the U. S.

* * *

Archer-Daniels-Midland Co. has acquired the Federal Foundry Supply Co. . . . Stewart-Warner Corp. has purchased the assets of the National Governor Co.

Consolidated Foundries & Mfg. Co. has acquired the investment casting business of N. A. Woodworth Co.

* * *

Allegheny Ludlum Steel Corp. has opened a new tool steel warehouse in Newark, N. J., to serve the New York sales territory.

* * *

Air Reduction Sales Co. has started construction of a multimillion dollar air separation plant in Acton, Mass.

* * *

Aerojet-General Corp. has established a new Astronautics Research Laboratory.

* * *

Firestone Tire & Rubber Co. has been granted eight patents in Spain and Italy for the production of Coral rubber, a replacement for natural rubber.

* * *

Westinghouse Electric Corp. is expanding its Cheswick, Pa., facilities for the manufacture of core components and complete core assemblies for nuclear reactors.

* * *

Lockheed Aircraft Corp. plans to have its nuclear aircraft research laboratory now being constructed near Dawsonville, Ga., in operation by the end of 1958.

* * *

Consolidated Electrodynamics Corp. has established a new Data Tape Div. to specialize in the engineering, design, and manufacture of a standard instrumentation line of magnetic-tape recording and reproducing equipment.

* * *

Grodyne Co. of America, Inc., has successfully flown the Navy XRON-1 rotorcycle powered by a modified automobile engine built by the Porsche Co. of Germany.

* * *

American Aerophysics Corp. has formed a new division to develop and manufacture fiberglas-reinforced plastic laminates.

* * *

A. V. Roe Canada Ltd. has concluded a reciprocal sales and manufacturing exchange agreement with General Precision Equipment Corp.

NEWS AUTOMOTIVE AND AVIATION



BRITISH JET TRAINER HAS TOP SPEED OF 290 MPH

British jet trainer, the Miles M.100, has wide car-type doors for easy entry and also for quick bale-out without an ejector seat. Cockpit seats two abreast and provides good all-around visibility. Mounting engine on top of fuselage reduces fire risks. Two smaller power units can be installed side by side for twin-jet training. With a single Blackburn Marbore engine, the M.100 has a top speed of 290 mph, and can land at 70.

Pratt & Whitney Offers Plan For Extended Credit Buying

Pratt & Whitney Co. has set up a new financing program with C.I.T. Corp. for extended credit for machine tool buyers, based on a sum of the digits depreciation method. The plan, with terms to 10 years and down payment requirements as low as 10 per cent, also covers Potter & Johnson Co., Pratt & Whitney subsidiary in Pawtucket, R. I. Both toolmakers will continue to offer terms of up to five years with equal monthly payments.

Ford of Canada Ups Sales, But Net Earnings Decline

Ford Motor Co. of Canada reported higher sales and lower earnings this year over the six months ended June 30, 1956. The company earned $6,908,095 in the first half of this year on sales of $199,794,000. Sales for the like period of 1956 were $195,600,000.

Earnings this year, company officials said, were adversely affected by higher costs for tooling and other production expenses connected with the new Edsel car. The first of the new Edsels rolled off the Oakville assembly lines in July, and their introduction is planned for early fall.

Sales to dealers in Canada were nearly four per cent higher at $184,884,000. Export shipments were $14,910,000, down 13 per cent from the first six months of 1956.

Unit sales of new passenger cars, trucks, and tractors totaled 85,000, of which 75,000 went to the domestic market and 10,000 were exported. This compares with a total of 94,000 units in the same period a year ago, with 78,000 domestic and 16,000 exported.

Passenger car sales for the period were within three per cent of the 1956 period, but sales of trucks were down nearly 15 per cent, largely owing to the later introduction of the 1957 models.

Automobile Mechanics Shortage Wins More Industry Attention

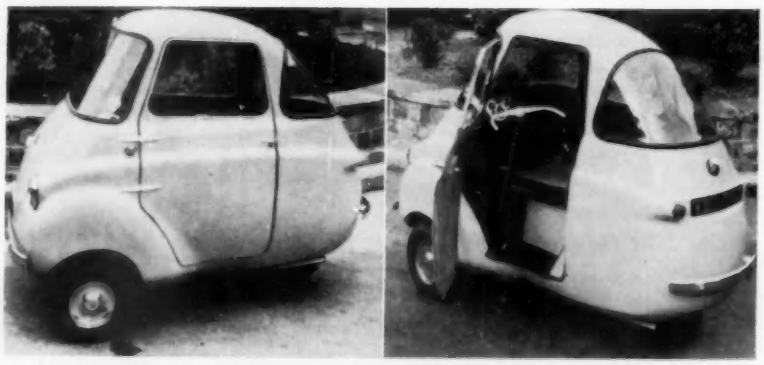
The U. S. will need an additional 425,000 mechanics by 1975 to service an estimated 100 million vehicles that will be on the country's highways by that time.

Myrle St. Aubin, director of the Service Section of General Motors Corp. and chairman of the Service Committee of the Automobile Manufacturers Association, told an audience of state officials at an AMA-sponsored luncheon in Philadelphia recently that the problem of where these trained mechanics are to come from is a matter of genuine concern to automobile manufacturers.

Reviewing the work carried on for the past 11 years by the Automotive Industry-Vocational Education Conference, Mr. St. Aubin disclosed that two more projects to solve the manpower problem are being considered. These are: a program to encourage more automobile mechanics teachers; and development of standards which can be used to judge individual aptitudes. He also said that the Conference and the industry are making an all-out effort to raise the prestige of automotive service work.

Eaton's Brazil Parts Plant Slated for 1958 Completion

Eaton S. A. Industria de Peças e Acessorios, an automotive parts manufacturing firm, will be in production in 1958 at its factory near Sao Paulo, Brazil. Construction of the one-story, 25,000 sq ft plant will begin soon, with completion scheduled for early next year, according to majority stockholder Eaton Manufacturing Co.



BRITISH SCOOTACAR CARRIES THREE PASSENGERS

British Scootacar, built by Hunslet Engine Co., is a three-wheel vehicle that seats two adults and one child, with some space for luggage. The under-seat engine of 12 cu in. displacement is integral with a four-speed transmission. Design features include a single door, handlebar steering, and hydraulic brakes.

Westinghouse Electric Reports Record Sales for First Half

Westinghouse Electric Corp. reported that sales for the first six months of 1957 totaled $982,939,000, a record for any first-half year. Net income for the period was $30,615,000.

For the second quarter, sales were $507,253,000 — a new high for the period—and net income was $16,417,000.

Referring to prospects for the rest of the year, Gwilym A. Price, president, reported that new orders are being entered on the company's books at rates that are maintaining present backlogs at very high levels. This is especially true, he said, in the manufacturing divisions and departments that make up the apparatus, atomic, and general products group. He added that increases in defense orders and shipments are anticipated in the second half of this year.



FORD INTRODUCES SELF-PROPELLED WINDROWER

The new self-propelled Dearborn windrower, built by Tractor and Implement Div., Ford Motor Co., is powered by a 30-hp engine with electric starter. The machine, first self-propelled implement to be brought out by the company, features center delivery to the windrow. Fields can be opened from any direction, and the machine can operate along fence rows and in square corners.



SQUARING THE CIRCLE

A machine that can "square a circle" is helping to cut the cost of jet engine parts at General Electric Co.'s Small Aircraft Engine Dept., West Lynn, Masss. The device, a polygon grinder, can grind internal and external spherical triangles, squares, ellipses, and circles. The tubular part shown here has a center ground in the shape of a spherical triangle.

Kiekhaefer Announces Program Of Engineering Scholarships

Kiekhaefer Corp. of Fond du Lac, Wisc. has announced a program of engineering scholarships for students who have shown interest in outboard motors and two- and four-cycle engines. The firm, which builds Mercury outboard motors, said the purpose of the program is to encourage young engineers to enter the outboard industry. The first four-year grant already has been made.

Allied Products Leases Plant Of Pressed Metals of America

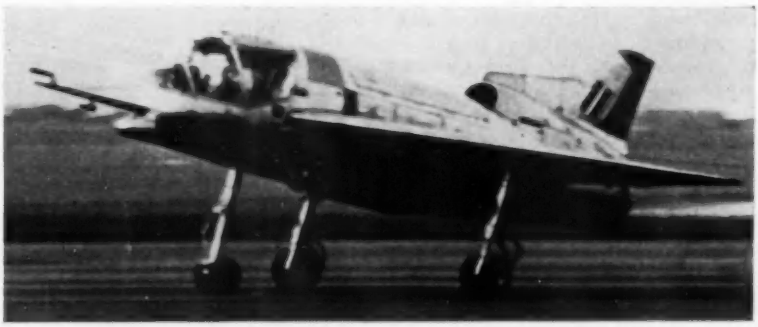
Allied Products Corp. expects to begin production sometime this month at the Pressed Metals of America Corp. plant, at Port Huron, Mich. The Detroit firm has signed a three-year lease for 58,000 sq ft, or one-fourth the total floor space, of the now-idle plant.

Working under license of John W. Leighton, former Pressed Metals president and holder of the patents involved, Allied Products will make some of the same automotive parts as Pressed Metals, chiefly tie bars and bushings for steering mechanisms. Allied Products purchased the necessary equipment for production start-up from Pressed Metals, including screw machines and hot and cold forging equipment. The company expects to use the Pressed Metals heat treat facilities on a rental basis.

Meanwhile, Allied Products, a highly diversified automobile and aircraft parts supplier, says it expects to go back into the powdered metal business. The company's Northville, Mich., powdered metal plant was destroyed by fire last month (Aug.).

Chevrolet Gives $335,000 For Employe Suggestions

Chevrolet Div. awarded $335,000 to employes during the first six months of 1957 for suggestions on labor, time and material saving methods, safety, and improved plant housekeeping and working procedures. A total of 25,000 ideas were submitted.



BRITISH VTOL PLANE MAKES INITIAL TEST RUN

British Short SC7 vertical take-off and landing plane took to the air recently. Development will continue for some time before unrestricted vertical take-off and change-over from hovering to forward flight are tried. It is powered by five Rolls-Royce turbojets.

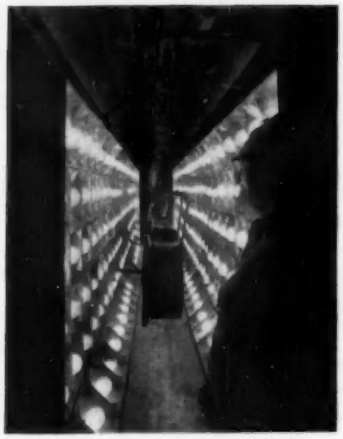
News AUTOMOTIVE AND AVIATION



BELL EXPERIMENTAL X-14 PASSES FLIGHT TESTS

Illustrated above is the new Bell X-14 vertical-rising aircraft built for the Air Force (See AI, July 15, p. 35). Powered by two Armstrong-Siddely jet engines, the plane is designed to take off vertically in a conventional horizontal position, shift to forward flight and land vertically. Thrust diverters or vanes located behind the engines direct the jet engine blast toward the ground to lift the plane into the air. For forward flight, the pilot re-directs the thrust toward the rear of the plane. The X-14 has a wing span of 34 ft and a length of 25 ft. Height is eight ft at the tail.

PLANE WHEELS HEATED



Magnesium aircraft wheels are subjected to 300 deg of infra-red heat to evaporate diochromate bath liquids and expand the magnesium at Goodyear Aircraft Corp. During the 10-minute stay in the heat room, expansion reaches the point where bearings, keys and other metal parts can be inserted with ease. After cooling, all parts have a "shrink fit" in the wheel itself.

Ford Gets $1.3 Million Contract For ¼-Ton Truck Engineering

Ford Motor Co. has been granted a $1.3 million contract by Ordnance Tank Automotive Command for vehicle engineering of an improved ¼-ton military truck with a unitized body-frame. Production contracts for the standardized M-151, with steel body-frame, have not been let, but Ford's special military vehicle office is developing preparatory drawings for bids.

Ford built 10 prototypes of the vehicle since 1952, the last four of which were delivered recently to Ordnance bases at Aberdeen, Md., and Yuma, Ariz. Two of the final group were of steel body-frame and two of aluminum. Although Ordnance has standardized the steel version, engineering work is continuing on the aluminum model, known as M-151-E2.

Minnesota Mining Sales Total $181 Million for First Half

Minnesota Mining & Manufacturing Co. sales for the first six months of 1957 amounted to $181,578,367, compared with $154,495,586 for the same period a year ago.

First half earnings totaled $19,692,980, compared with $17,670,767 for the first half of 1956. Earnings before taxes were $39,132,980 against $35,654,767 for the like period a year ago.

Herbert P. Buetow, 3M president, told stockholders that the slightly narrower pre-tax profit margins resulted from price reductions in some tape lines and lower profit margins of recently acquired subsidiaries.

Square D Co. Earnings Decline As Plants Tool for Production

Square D Co. reported higher sales but lower earnings during the first six months of 1957 as factories in Milwaukee and Lexington, Ky. were completed and tooled for production. Sales were $50,696,210, compared with $48,446,620 during the same period a year ago, and earnings totaled $4,464,656, a drop from $5,218,096 a year ago.

Square D's Milwaukee control equipment factory now is producing at one-half capacity. The Lexington distribution products factory is scheduled to begin pilot operation this month (Sept.).



FIAT BUS BUILT FOR STOP-AND-GO CITY TRAFFIC

This 90-passenger Fiat bus is 36 ft long, 8.2 ft wide, and 9.61 ft high with a wheelbase of 20.17 ft. Its six-cylinder engine has a maximum output of 140 bhp at 1800 rpm.

• • INDUSTRY STATISTICS • •

1957 WEEKLY U. S. MOTOR VEHICLE PRODUCTION

As reported by the Automobile Manufacturers Association

Make	Weeks Ending August 17	Weeks Ending August 10	Year to Date 1957	Year to Date 1956
PASSENGER CAR PRODUCTION				
Hudson	0	0	1,345	4,347
Nash	0	0	3,561	11,073
Rambler	0	0	57,822	51,930
Total—American Motors	0	0	62,728	67,350
Chrysler	1,872	1,704	86,652	79,368
De Soto	2,498	764	84,178	68,730
Dodge	5,634	5,872	208,200	136,443
Imperial	559	530	29,151	*
Plymouth	15,135	15,721	474,928	308,089
Total—Chrysler Corp.	25,698	24,591	883,109	592,630
Edsel	4,291	3,450	12,618	
Ford	28,408	28,690	1,016,634	884,094
Lincoln and Continental	289	222	26,637	33,117
Mercury	3,698	5,644	203,344	176,079
Total—Ford Motor Co.	36,686	38,006	1,259,233	1,093,290
Buick	6,878	7,285	278,736	384,358
Cadillac	2,700	3,346	105,876	104,327
Chevrolet	31,534	30,351	1,004,231	1,074,610
Oldsmobile	6,597	6,917	271,028	304,004
Pontiac	6,684	6,786	240,162	227,716
Total—General Motors Corp.	54,393	54,687	1,900,033	2,095,015
Packard	3	13	6,118	13,289
Studebaker	823	1,569	40,265	54,082
Total—Studebaker-Packard Corp.	826	1,582	46,383	67,371
Checker Cab	61	0	2,657	2,306
Total—Passenger Cars	117,664	118,866	4,154,143	3,917,962
TRUCK PRODUCTION				
Chevrolet	7,355	6,937	232,880	239,923
G. M. C.	1,102	1,122	43,574	61,630
Diamond T	125	126	3,387	3,268
Divco	24	24	1,987	2,513
Dodge & Fargo	1,516	1,467	52,255	58,476
Ford	6,531	5,111	228,744	201,595
F. W. D.	28	21	726	1,132
International	2,345	2,373	77,516	88,890
Mack	342	344	11,061	11,825
Reo	132	125	2,877	2,498
Studebaker	127	189	7,166	10,590
White	277	286	9,611	11,572
Willys	0	0	39,692	37,091
Other Trucks	70	70	2,787	4,356
Total—Trucks	19,974	18,195	714,245	735,159
Buses	50	65	2,720	2,913
Total—Motor Vehicles	137,688	137,126	4,871,108	4,656,034

* Included with Chrysler.

RETAIL CAR SALES BY PRICE GROUPS*

NUMBER OF CARS

Price Group	June 1957 Units†	June 1957 % of Total	June 1956 Units†	June 1956 % of Total
Under $2,000	1,084	.22	102,861	19.38
$2,001 to $2,500	329,171	65.65	283,593	53.42
$2,501 to $3,500	135,502	27.03	123,876	23.33
Over $3,500	35,602	7.10	20,556	3.87
Total	501,359	100.00	530,886	100.00

Price Group	Six Months 1957 Units†	Six Months 1957 % of Total	Six Months 1956 Units†	Six Months 1956 % of Total
Under $2,000	18,518	.62	576,582	18.92
$2,001 to $2,500	1,857,547	62.09	1,666,850	54.70
$2,501 to $3,500	861,138	28.78	678,445	22.27
Over $3,500	254,598	8.51	125,165	4.11
Total	2,991,801	100.00	3,047,042	100.00

DOLLAR VOLUME OF SALES

Price Group	June 1957 Dollars	June 1957 % of Total	June 1956 Dollars	June 1956 % of Total
Under $2,000	$ 1,655,266	.13	$ 202,264,131	16.34
$2,001 to $2,500	741,399,006	56.61	608,255,745	49.12
$2,501 to $3,500	384,008,564	29.32	338,906,853	27.37
Over $3,500	182,585,101	13.94	88,770,915	7.17
Total	$1,309,647,939	100.00	$1,238,197,644	100.00

Price Group	Six Months 1957 Dollars	Six Months 1957 % of Total	Six Months 1956 Dollars	Six Months 1956 % of Total
Under $2,000	$ 34,270,330	.44	$1,128,221,930	15.82
$2,001 to $2,500	4,172,072,473	53.27	3,588,529,148	50.33
$2,501 to $3,500	2,429,489,316	31.02	1,877,796,253	26.34
Over $3,500	1,195,618,957	15.27	535,792,955	7.51
Total	$7,831,431,076	100.00	$7,130,340,286	100.00

*—Calculated on basis of new car registrations, as reported by R. L. Polk & Co., in conjunction with advertised delivered price at factory of four-door sedan or equivalent model. Does not include transportation charges or extra equipment.

†—New registrations of American made cars only. Does not include imported foreign cars.

1957 NEW REGISTRATIONS

Based on data from R. L. Polk & Co.

Arranged by Makes in Descending Order According to the 1957 Six Months' Total

NEW PASSENGER CARS

MAKE	June 1957	May 1957	June 1956	SIX MONTHS 1957	SIX MONTHS 1956
Ford	131,841	139,127	120,696	763,670	665,733
Chevrolet	127,762	134,322	148,540	722,396	805,100
Plymouth	56,335	58,202	43,024	315,770	257,318
Buick	32,230	35,198	46,060	218,014	294,194
Oldsmobile	28,856	33,699	39,561	199,295	238,201
Pontiac	27,718	30,359	31,664	171,581	192,313
Mercury	22,398	27,118	24,611	144,270	142,892
Dodge	23,183	25,332	20,790	136,133	113,587
Chrysler	11,393	13,414	10,557	75,552	62,799
Cadillac	11,147	13,165	12,433	73,734	73,809
De Soto	8,535	9,807	9,133	57,448	53,660
Rambler	8,897	9,164	6,304	43,940	36,830
Studebaker	5,573	5,129	6,322	31,177	44,441
Lincoln	2,402	3,071	3,877	19,328	21,896
Nash	799	986	2,020	6,106	14,659
Metropolitan	1,094	1,036	688	5,140	2,765
Packard	480	534	2,772	3,318	17,781
Hudson	395	466	1,415	3,222	7,138
Continental	74	89	106	497	937
Misc. Domestic	473	417	472	2,178	1,829
Foreign	15,468	15,689	8,733	78,104	40,603
Total—All Makes	517,043	556,324	539,777	3,070,875	3,068,467

NEW TRUCKS

MAKE	June 1957	May 1957	June 1956	SIX MONTHS 1957	SIX MONTHS 1956
Chevrolet	24,735	28,125	26,547	145,840	153,257
Ford	24,529	28,276	23,416	135,551	134,407
International	7,015	8,585	8,964	45,056	54,691
G.M.C.	4,651	5,651	6,943	32,047	43,326
Dodge	3,849	4,450	5,760	24,231	29,431
Willys Truck	1,201	1,212	1,174	7,619	6,573
White	1,078	1,246	1,324	6,775	8,089
Mack	1,084	1,257	1,084	6,567	6,578
Studebaker	492	644	711	3,789	5,021
Willys Jeep	540	504	718	3,088	4,013
Diamond T	267	268	301	1,719	2,030
Divco	190	282	310	1,483	1,717
Reo	175	200	311	1,196	1,545
Kenworth	124	70	126	512	623
Brockway	44	98	100	351	536
Peterbilt	33	53	77	256	291
F.W.D.	35	25	32	256	221
Misc. Domestic	77	90	124	438	571
Foreign	1,216	1,272	477	6,037	2,097
Total—All Makes	71,335	82,308	78,501	422,812	455,007

MEN IN THE NEWS



Olin Mathieson Chemical Corp.—Sam Gurley, Jr., is now vice president of sales for Olin aluminum.

Chrysler Corp., Defense Operations Div.—**Chester C. Utz** has been named executive engineer.

Rochester Products Div., General Motors Corp. — **William D. Parsons** has been named manager of the Detroit sales office.

Willys - Overland Export Corp. — **Sydney W. Taylor** and **L. Keith Covelle, Jr.**, were elected vice-presidents.

Hyatt Bearings Div., General Motors Corp.—**Kenneth H. Bender** was named comptroller.

American Motors Corp.—**Guy Hadsall, Jr.**, has been appointed assistant merchandising manager of the automotive division.

Ford Div., Ford Motor Co.—**G. B. Price** has been named executive assistant to the general manufacturing manager, and **Sanford Kaplan** was named planning and engineering manager at the Long Beach, Calif., assembly plant.

New Departure Div., General Motors Corp.—**George A. Stout** has been appointed administrative assistant to the general manager, and **Nicholas St. Peter** will succeed him as comptroller.

Aeroquip Corp.—**William H. Rowley** is now manager, military requirements of the Jackson Div., and **A. H. Cassidy** has been appointed industrial sales manager at Marman Div.

Baker Bros., Inc. — **Stephen B. Sponder** was appointed plant manager.



Ford Motor Co. — Lewis E. Zwissler has been appointed styling administration manager.



Hartford Specialty Machinery Co., Contract Sales Div.—Harvey L. Spaunburg, Jr., and James J. Jones have been appointed manufacturing manager and sales manager, respectively.

Armstrong Cork Co. — **Edmund Claxton** was named vice-president for new product planning; **W. F. Kaufman**, general manager of new product planning; **F. B. Menger**, director of research; and **W. N. Hartman, Jr.**, head of new products coordination.

Consolidated Electrodynamics Corp. —**Harold F. Wiley** was appointed director of the new Analytical and Control Instruments Div., and **A. P. Stuhrman** has become manager of the Central Mfg. Div.

Westinghouse Electric Corp.—**Richard C. Lipps** was named manager, and **Harry J. Bichsel** has become engineering manager of the welding department.

Norton Co., Grinding Machine Div. —**Irwin W. Peterson** has been appointed Detroit district manager.

Douglas Aircraft Co., Inc.—**Harold G. Hynd** was named general manager of the El Segundo Div., and **Jess L. Jones** succeeds him as general manager of the Tulsa Div.

Bliss & Laughlin, Inc.—**Bertil E. Anderson** has been named director of advertising and public relations.

Micromatic Hone Corp. — **John Bishop** was named Detroit regional sales manager.



Lindberg Engineering Co., Gas Process Div. — Charles A. Mueller was named chief engineer.



Westinghouse Electric Corp.—Allan Chilton is now manager of the new engineering center for corporate advanced design and development programs.

Borg-Warner Corp., Spring Div.— **A. J. Welch** has been promoted vice-president and assistant general manager, and **Charles Pacola** succeeds him as sales manager.

Raybestos-Manhattan, Inc., Plastic Products Div. — **Arthur W. Byxbee** has been promoted to general manager of the Paramount, Calif. plant, and **Howard H. Herr, Jr.** succeeds him as sales manager of the division.

Doehler-Jarvis Div., National Lead Co.—**Clyde E. Claus** was made plant manager of the Grand Rapids, Mich., plant.

Necrology

Earl E. Eby, 71, retired manager of Power and Industrial Equipment Div. of General Motors Overseas Operations Div., died Aug. 8, at Orange, N. J.

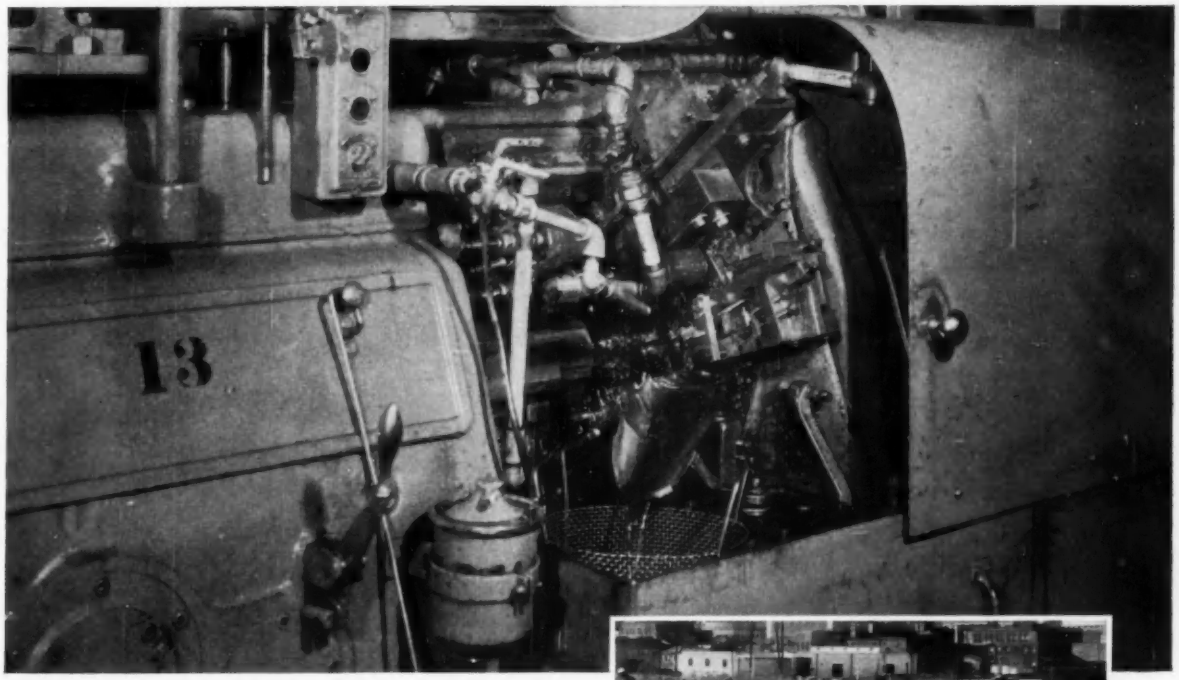
Percy W. Carr, 60, general manager of Specialties Div. of Curtiss-Wright Corp., died Aug. 8, at Maplewood, N. J.

Kenneth T. King, 65, retired manager of Fine Chemicals Div. of E. I. du Pont de Nemours & Co., died Aug. 8, at Alden, Mich.

Augustine J. Cunningham, 79, president of James Cunningham & Son Co., Inc., died recently, at Rochester, N. Y.

Thomas McLean Jasper, 74, technical consultant to the Research Div. of A. O. Smith Corp., died Aug. 3, at Milwaukee, Wis.

F. Ray Peterson, 55, assistant to the president of R. G. LeTourneau, Inc., died recently, at Longview, Tex.



Nelson uses a battery of National Acme multiple spindle automatics, Brown & Sharpe single spindle automatics, and many Nelson Vertical single spindle automatics for threading and boring its end welding studs. Various stainless and 1015 to 1020 steels are used. Each machine has rack for handy storage of steel bars. Coolant is *Texaco Transultex Cutting Oil.*



Bridge of composite construction, showing Nelson end welding studs fastened to I beams, ready for pouring of concrete. Studs of many sizes and shapes are flux-filled—welded with semi-automatic Nelweld gun.

"Changing to Texaco upped production and lowered maintenance costs"

—reports Nelson Stud Welding Division, Gregory Industries, Inc., Lorain, Ohio.

"Your lubrication engineer was right when he recommended *Texaco Transultex Cutting Oil.* It has reduced our machining problems to a minimum."

This customer manufactures studs for end welding. They are forced to choose materials for weldability and service, regardless of their machinability. And this often presents tough production problems. At least it did, until a Texaco Lubrication Engineer recommended *Texaco Transultex Cutting Oil.*

After switching to Texaco, the customer reports, "Production has increased beyond our expectations, and maintenance costs have been substantially reduced." What's more, machines now stay cleaner, shop housekeeping is made easier.

Let your local Texaco Lubrication Engineer help you select the best cutting, grinding or soluble oil for top efficiency at lowest cost. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO

TEXACO CUTTING, GRINDING, SOLUBLE AND HYDRAULIC OILS

The EDSEL ... *America's Newest Car*

THE first automobile maker to announce its 1958 line is the new Edsel Division of Ford Motor Co. with two series on 118-in. wheelbase, two series on 124-in. wheelbase, and five station wagons on 116-in. wheelbase. All vehicles mounted on 116- and 118-in. wheelbase will be assembled on designated Ford lines; all on 124-in. wheelbase will be assembled on designated Mercury lines.

Entirely new in styling and design, Edsel cars bristle with interesting features, some of which are "firsts" in the industry. In this category is the "Teletouch" electric pushbutton automatic transmission selector. Here the selector buttons—P, R, N, Dr, and Lo—are mounted in the center of the steering wheel hub where they are readily reached with minimum hand movement.

A distinctive air ride system is being readied for introduction later in the season and will be offered as optional equipment at the factory.

Two new engines are introduced for this line. The 361 cu in. engine is used in the 116- and 118-in. wheelbase cars; the 410 cu in. engine for all models mounted on 124-in. wheelbase. The 361 cu in. engine has wedge-shaped combustion chamber while the 410-cu in. engine has what is termed a cylindrical wedge chamber. In the latter case, the face of the cylinder head is flat, and the top face of the cylinder block bank is machined at an angle of plus 10 deg with respect to the piston axis. Here they use a stepped piston head to produce the combustion chamber contour. Both engines have a compression ratio of 10.5 to 1.

Edsel frames are of ladder type with box-section side rails. The front cross member carries the front lower control arms, the number two cross member supports the front engine mounts and rear lower control arms on 116- and 118-in. wheelbase. On the 124-in. wheelbase chassis front engine mounts are supported on the side rails. The front suspension system is of coil spring type, employing the integral front spindle

Two models in the Citation series—a two-door hardtop and a Citation convertible





Two-door sedan in the Ranger series, lowest price car in the Edsel line



This is the all-new Edsel four-door hardtop in the Corsair series

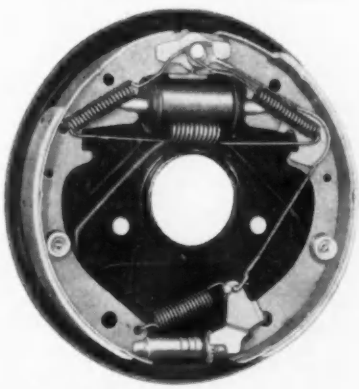
used in conjunction with upper and lower ball joints. The lower arm of the suspension is swept back 20 deg to produce a trailing arm effect, said to improve the ability of the front wheels to smooth out road irregularities. A link type stabilizer bar is provided at the front end on all 118- and 124-in. wheelbase cars while a linkless torsion bar is found on the station wagon chassis.

A new recirculating ball-and-nut type steering gear, and a unique power steering gear employing the recirculating ball-and-nut principle appear on the Edsel. Both are Ford-designed and Ford-produced, the power steering gear being offered as optional equipment when the automatic transmission is specified.

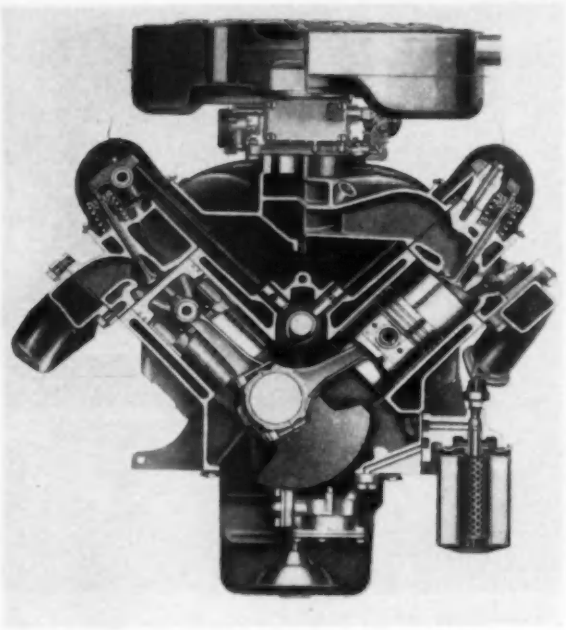
The steering column pushbutton control system is designed to have the pushbutton dial remain stationary when the steering wheel is turned. To effect this it was necessary to introduce a small planetary gear set below the pushbutton assembly. As illustrated, a large gear is attached to the fixed housing and a corresponding gear attached to the lower end of the pushbutton assembly. A stud mounted in the rotating housing which communicates with the steering column carries two zero backlash pinions which mesh with the two large gears.

Now when the steering column is rotated the pair of pinions move around the periphery of the large gears. Since one of the latter is fixed, the other remains stationary while the pinion moves around them.

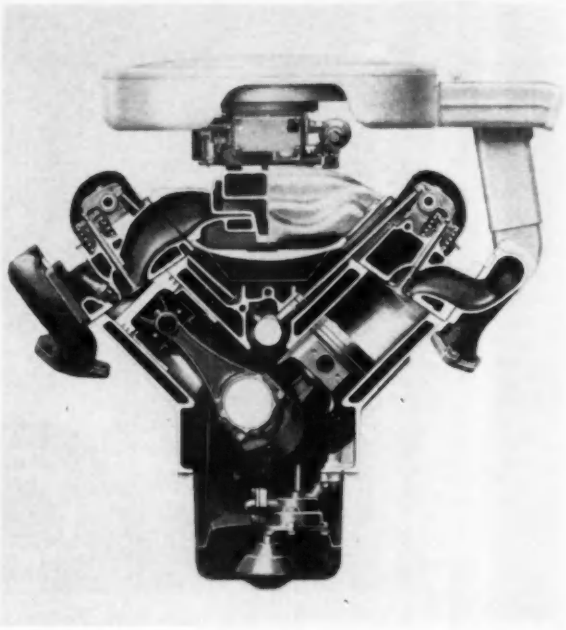
Looking at the same illustration it may be noted that when a button



Edsel automatic brake adjuster maintains brake adjustment for life of lining



Sectional view of the 361 cu in. engine



The 410 cu in. engine has a flat cylinder head with the combustion chamber in the cylinder

is depressed it closes a circuit leading to one of the slip rings mounted in the lower end of the steering column, thence to the block which is attached to the wall of the column. From the block current flows to a relay and the latter then energizes the small motor which effects the shift. The motor is attached directly at the transmission, connecting to the shift selector valve by means of mechanical linkage.

The operating principle of the power steering gear is quite unique, representing a radical departure in the method of actuating the control valve. In the Edsel gear the movement of the spool valve is effected by means of a small torsion bar of light cross-section. Torque applied at the column twists the torsion bar and this twist is translated into a lateral displacement of the spool valve by means of a nut and screw connected to the torsion bar. The mechanism also includes means for restricting the angular displacement of the torsion bar within a specified limit.

The Bendix linkage type power steering gear is available for cars equipped with manual shift transmissions as an accessory item which can be installed by the dealer.

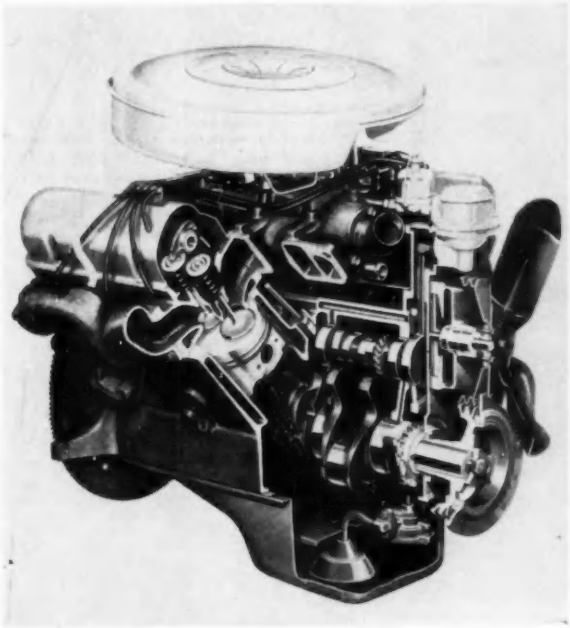
Rear suspension is of leaf spring type with tension-type rear shackles and Silent-bloc rubber front mounts on the 116- and 118-in. wheelbase chassis, the 124-in. chassis employing compression type shackles at the rear.

Rear axles are of semi-floating, hypoid gear type with the high pinion offset introduced by Ford Motor Co. last year to aid in lowering the driveshaft tunnel.

Front brakes are 11 x 2.5 in. on the 116- and 118-in. wheelbase chassis; 11 x 3 in. on the 124-in. wheelbase chassis. Rear brakes are 11 x 2 in. on all chassis. The hydraulic brake system is of the Bendix duo-servo type, featuring an automatic brake adjuster. The

EDSEL ENGINES | *Brief Mechanical Specifications*

	Ranger-Pacer-Wagons	Corsair-Citation
Type	OHV 90-deg V-8	OHV 90-deg V-8
Bore (in.)	4.05	4.20
Stroke (in.)	3.50	3.70
Displacement (cu in.)	361	410
Compression ratio	10.5 to 1	10.5 to 1
Bhp (max.)	303 @ 4600 rpm	345 @ 4600 rpm
Torque (lb ft) max.	400 @ 2800 rpm	475 @ 2900 rpm
Firing Order	1-5-4-2-6-3-7-8	
Bhp/cu in. ratio	0.839	0.841
Torque/cu in. ratio	1.108	1.159



Part cutaway of the 410 cu in. engine

automatic brake adjusting screw is engaged with and rotated by a stamped lever at the lower end. The lever is actuated by a cable and coil spring, adjusting action taking place on reverse braking. This arrangement is said to assure uniform braking action for the life of the lining. Power brakes are available as an extra cost item.

Coming to the details of the new engines, it is of general interest to note that crankshafts and camshafts are of precision-molded type, the crankshaft being of five-bearing design, vector-balanced. Pistons are of Autothermic, cam-ground type, made of heat treated aluminum alloy, with integral steel struts. Hydraulic valve lifters are standard equipment.

The oil filter is of full-flow type with a throw-away cartridge. Four-barrel carburetors and fuel pumps are of different size and type for each of the two engines. The air cleaner is of dry, disposable type on both engines.

On the 410-cu in. engine the air induction system automatically selects the correct temperature air for the most efficient fuel-air mixture. This air is directed to the carburetor through a special air duct assembly located between the air intake and exhaust manifold. The intake manifold on this engine is water-warmed.

The cooling system for the 410-cu in. engine has a three-stage control through calibrated thermostats. The first stage permits circulation of coolant within the heads and intake manifold. The second stage allows circulation in the heads, intake manifold and block. The third stage comes into play when the thermostat located in the intake manifold opens to permit the coolant to flow through the radiator.

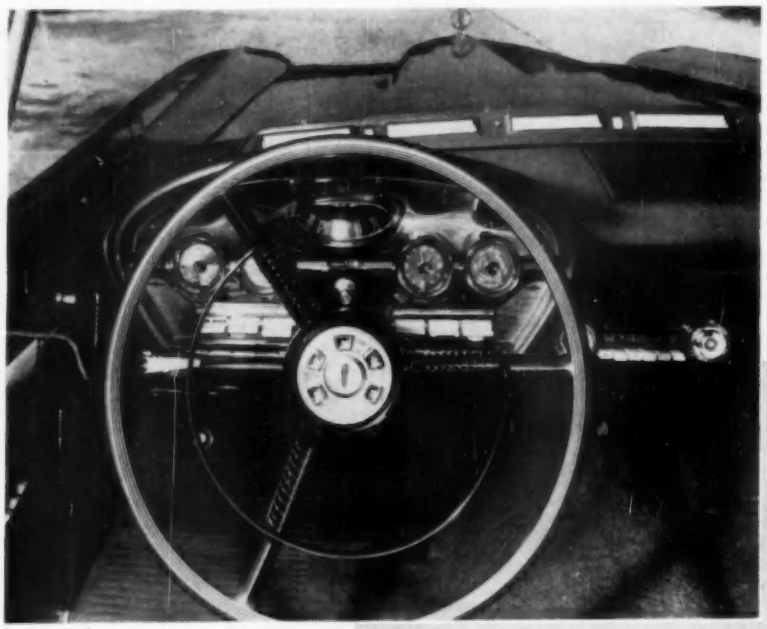
A single exhaust system is standard equipment, dual exhaust being optional except on the convertibles where it is standard.

The Teletouch transmission selector, mentioned earlier, is located in the center of the steering wheel hub. When a button is pushed, it makes an electrical contact, activating its relay. The relay, in turn, causes the actuating motor to come into play, thereby engaging the transmission in the selected position. To start the engine, selector buttons must be in either P or N position. One of the safety features is that when ignition is off, the transmission can be shifted into P position but then it is impossible to change the selection until ignition is on. A built-in safety switch prevents the transmission from engaging reverse gear when exceeding the speed required for rocking the car in snow or mud. The same switch prevents engagement of the P position above a safe low speed.

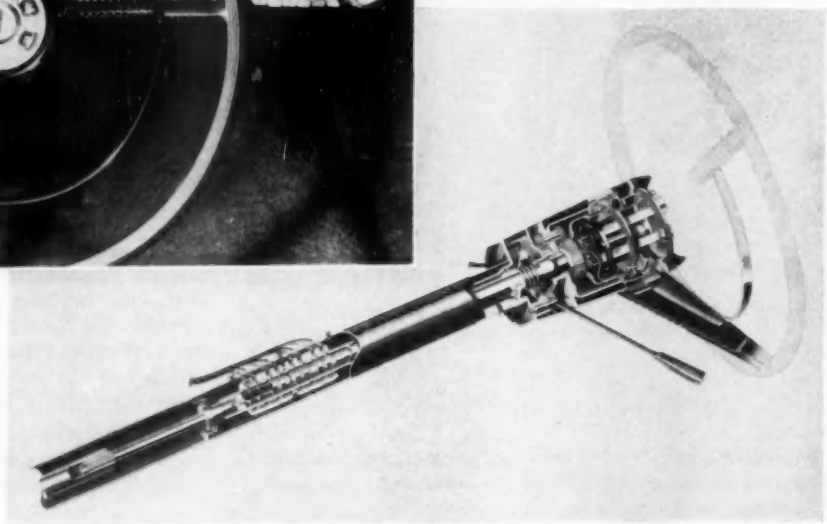
The transmission setup for the new line is comprehensive. First of all, the automatic transmission is supplied as standard equipment on all 124-in. wheel-

EDSEL | *Car and Station Wagon Specifications*

Series		Wheelbase (inches)	Length, With Bumper Guards (inches)	Height (inches)	Width (inches)]
Ranger	Two Door Sedan Two Door Hardtop Four Door Sedan Four Door Hardtop	118	213.1	56.4	78.8
Pacer	Two Door Hardtop Four Door Sedan Four Door Hardtop Convertible	118	213.1	56.4	78.8
Corsair	Two Door Hardtop Four Door Hardtop	124	218.8	56.8	79.8
Citation	Two Door Hardtop Four Door Hardtop Convertible	124	218.8	56.8	79.8
Wagons	Two Door 6-Pass. Four Door 6-Pass. Four Door 6-Pass. Four Door 9-Pass. Four Door 9-Pass.	116	205.4	58.8	77.1



Driver's eyeview of the instrument panel and "Teletouch" push button transmission controls located in the steering wheel hub



Cutaway view of the steering column showing details of the transmission control

base models; optional on the others. The synchromesh transmission is standard equipment on all Ranger and Pacer series. In addition, overdrive is available as optional equipment. This consists of a conventional three-speed transmission with the addition of an automatic planetary gear unit for overdrive. A single-plate, semi-centrifugal type clutch is supplied with the standard and/or overdrive transmissions.

Chassis of the Corsair and Citation series



Among the numerous items of special equipment, Edsel offers a self-contained air conditioning, heating, and defrosting unit controlled by a single rotary dial with a stationary pointer. An electric servo motor is energized by the single control which, in turn, makes all mechanical adjustments over the entire range. A two-speed blower is operated by a toggle switch. Another noteworthy accessory is the automatic rear deck lid opener, electrically-operated by means of a solenoid. The latter is energized by a key-lock protected button on the instrument panel. The deck lid also can be opened from the outside in the usual manner. Still another item is the power seat which is controlled by a single four-way toggle switch located to the left of the instrument cluster.

Edsel cars are equipped with multiple headlights, as illustrated. Outboard lights come on for low beam illumination. All four lamps go on when high beam road lighting is desired. Choice of high or low beam is controlled by a foot switch. Parking lights and turn signals follow the curvature of the grille to provide side visibility.



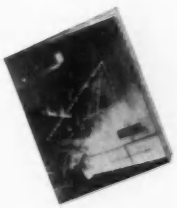
19% PRODUCTION INCREASE AND SUPERIOR FINISH

when Universal Engineering Co. switched to

LEADED 6150

In the production of this collet, Universal Engineering Co. reported it was able to increase spindle speed from 308 to 374 R.P.M. and machine speed from 108 to 125 S.F.M. Feed was stepped up from .0027 to .0047 inch per revolution. In addition to a production increase from 101 to 120 pieces per hour, finish was greatly improved and tool life was extended appreciably.

These are typical benefits obtained by users of lead treated Aristoloy Steels—benefits which you can enjoy by getting in touch with your nearest Copperweld district office.

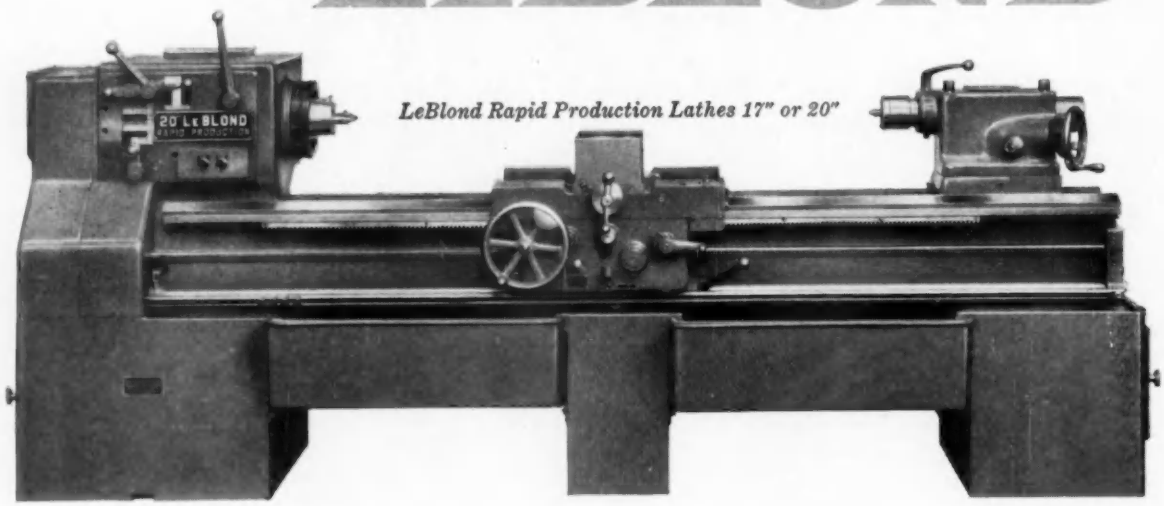


JUST OFF THE PRESS
New Leaded Steel Catalog.
Write for your copy today.

COPPERWELD STEEL COMPANY • Steel Division
4025 Mahoning Avenue • WARREN, OHIO
EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

ARISTOLOY STEELS

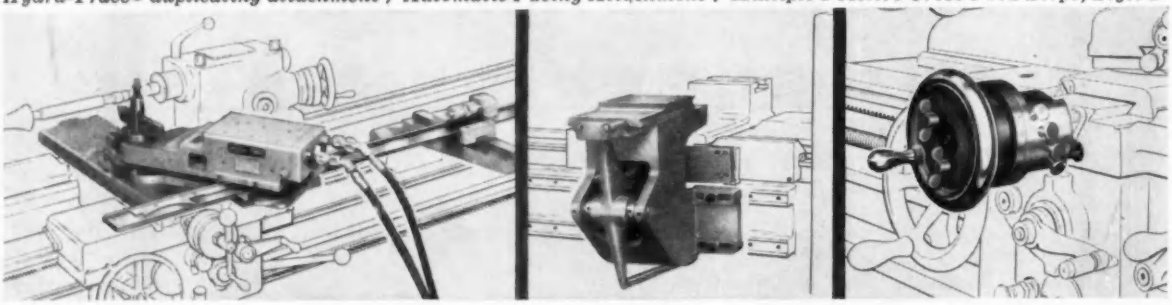
another ALL NEW LeBLOND



LeBlond Rapid Production Lathes 17" or 20"

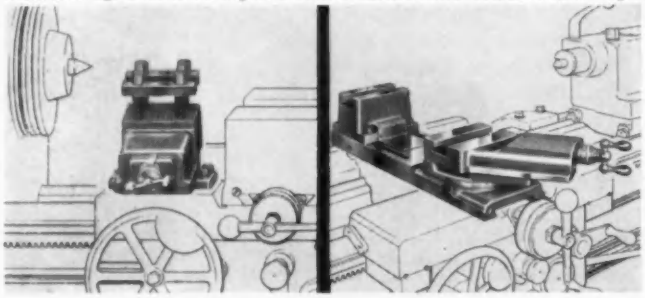
a low cost manufacturing lathe

Hydra-Trace® duplicating attachment / Automatic Facing Attachment / Multiple Positive Cross Feed Stops, Style B



with exactly the custom features you want

Full Swing Rests / Compound and Plain Connected Rest / many more useful attachments. Write for Bulletin RP-220N



World's Largest Builder of A Complete Line of Lathes for more than 70 years

LeBLOND of Cincinnati

THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

AI

AUTOMOTIVE INDUSTRIES

Machine Tool Section

BORING
BROACHING
DEBURRING
DRILLING
GRINDING
HONING
MILLING
TAPPING
TRANSFERRING
TURNING

MACHINE TOOL AND PRODUCTION EQUIPMENT

INCREASED DEMANDS

of AUTOMOTIVE INDUSTRY...

met with

BULLARD

Mult-Au-Matic, Type "L"

The challenge to supply the increased requirements for automatic transmissions needed to meet automobile manufacturers' schedules was solved at the Midwestern plant of a leading manufacturer of automotive parts with a 10" 12 spindle, single index Bullard Mult-Au-Matic, Type "L".

At present, the machine is tooled for the front drum of an automatic transmission and delivers a finished piece — turned, bored, counterbored and faced — with each index of the table — one every 63 seconds. The end result— more finished pieces per hour at less cost per piece.



THE BULLARD COMPANY
286 CANFIELD AVENUE • BRIDGEPORT 9, CONN.
Please send me a copy of the NEW MULT-AU-MATIC, TYPE "L" CATALOG

Name _____ Position _____
Company _____
Address _____ Zone _____ State _____
City _____

Remember
to cut costs when
cutting metal —
buy BULLARD

Call your nearest Bullard Sales Engineer—he'll show you how.

THE BULLARD COMPANY BRIDGEPORT 9, CONNECTICUT

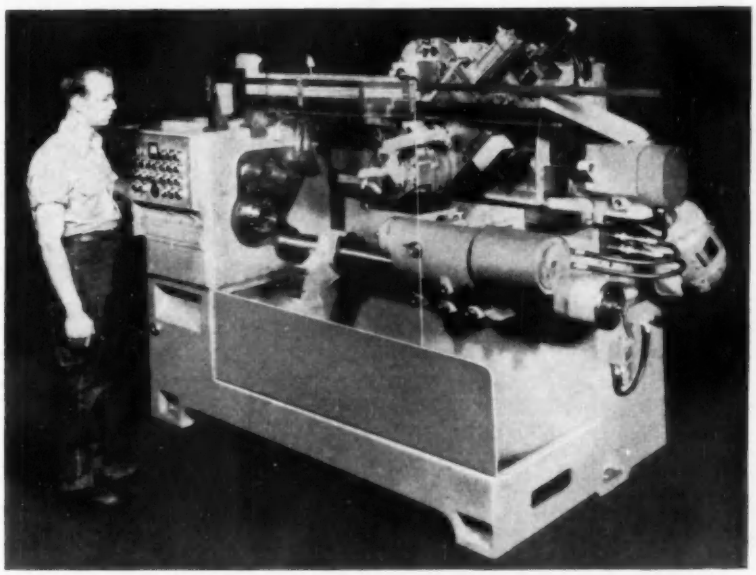
MACHINE TOOLS

FOR ADDITIONAL INFORMATION
please use reply card on PAGE 183

SUNDSTRAND MACHINE TOOL CO.

TRACER LATHE—Model 14T multi-cycle tracer lathe can perform several operations in the machining of irregular shapes. Two roughing cuts, a semi-finish, and finish cut may be obtained in one automatic cycle. Only one template is required for the multi-cycle cuts. An indexing tool turret permits use of two cutting tools, one for roughing and one for finishing. Shoulder facing tools can be provided if desired for squaring and other operations. Front loading of the machine lends itself to easy handling, and is suited for automatic handling mechanism. The transmission-type head is available in a two, four or eight-speed type. Automatic speed changes are provided for all cuts of a cycle with each type of head.

Circle 30 on postcard for more data



Sundstrand Model 14T tracer lathe performs multiple operations in one cycle

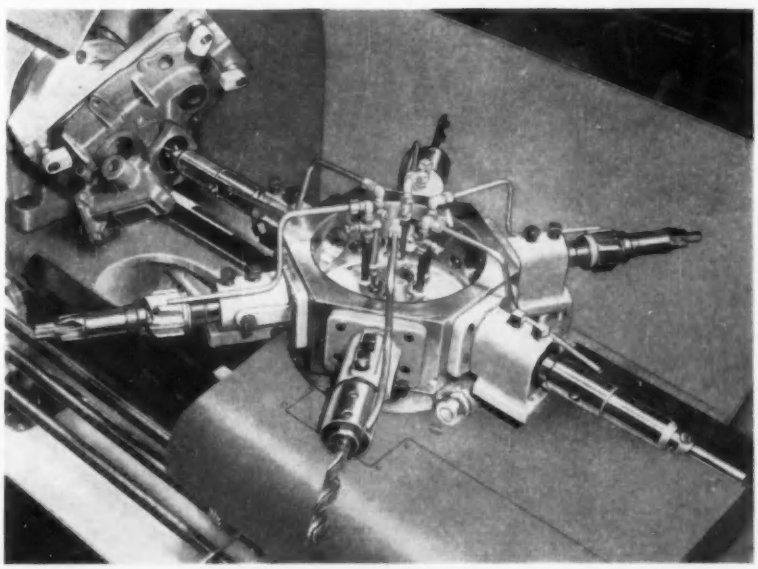
GISHOLT MACHINE CO.

AUTOMATIC LATHE — Gisholt Masterline 2F Fastermatic automatic turret lathe has a special setup for machining cast iron steering gear housings. Because of the odd shape of the workpiece, a special chucking fixture is used to properly locate and hold the part during machining operations.

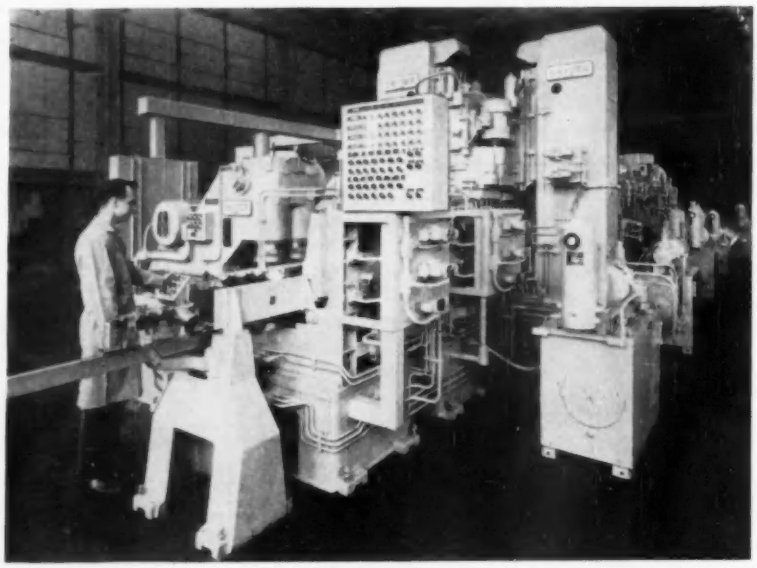
After rough drilling on the first hexagon turret station, multi-diameter cutters machine three diameters at the rear of the workpiece and one at the front, and also form and chamfer. The operation is then completed using piloted micro-bore tooling which finish-bores two diameters at the rear and one at the front of the part. Floor-to-floor time is 3.25 minutes, and a 0.0005-in. tolerance is held in the small rear bore.

The Fastermatic's hexagon turret is also double-tooled, with the cycle beginning on the first hexagon turret station and the part being completed on No. 3. The cycle then stops, the operator unloads the finished part, loads a new rough workpiece, and again initiates the cycle start button. Tooling on hexagon turret stations Nos. 4, 5 and 6 complete another part. Consequently, two complete parts are produced with each turret indexing.

Circle 31 on postcard for more data



Gisholt 2F Fastermatic automatic turret lathe is double-tooled to complete two parts with each index of the hexagon turret. Note special fixture for holding workpiece.

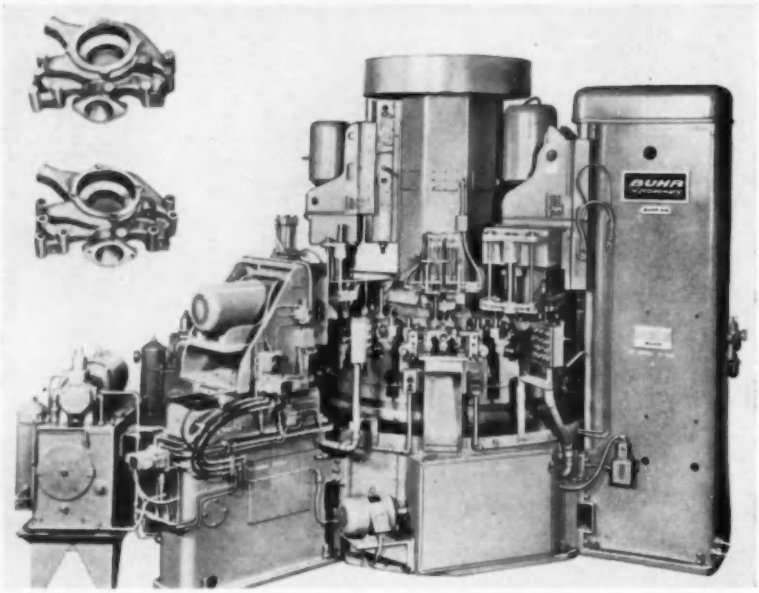


SNYDER TOOL & ENGINEERING CO.

TRANSFER MACHINE—Featuring flexibility built into a segmented in-line transfer machine, a special unit has been designed for milling, drilling, chamfering and tapping two different exhaust manifolds. Production rate is 136 manifolds per hour. Built-in sensing devices in the 28-station, 63-ft long automated machine permit the two different parts to be processed through the operations at random. Machining units are Snyder standard type with hardened and ground ways; seven way-type units and eight self-contained units are used. The machine is hydraulically-operated and electrically-controlled throughout.

Circle 32 on postcard for more data

Snyder 28-station transfer machine simultaneously handles two different exhaust manifolds. Net production rate is 136 manifolds per hour

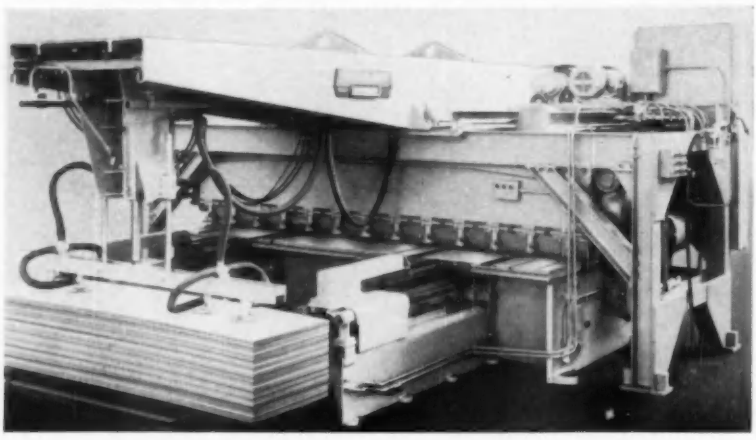


BUHR MACHINE TOOL CO.

TRANSFER MACHINE — Processing 102 pieces per hour at 100 per cent efficiency, this Economatic machine was built to perform 55 operations on a water pump housing. The operations consist of one milling, 18 drilling, 10 reaming, seven chamfering, 10 tapping, seven spotfacing, and two boring. Stated features of the machine include ease of conversion to machine other parts, and ready detachability of the automatic index unit which actuates table. Other features are: automatic clamping of parts, lubrication and chip removal.

Circle 33 on postcard for more data

Buhr Economatic machine designed for machining water pump housing



CINCINNATI SHAPER CO.

AUTOMATED SHEAR — A unit called the Auto-Shear employs the company's 1812 series shear in conjunction with automatic handling equipment to form an automated sheared-blank production machine. This equipment picks up the unsheared sheet, deposits it on the shear table, feeds it into the shear against the back gage, and makes the cut. Sheared blanks are conveyed beyond the rear of the machine, where they are picked up and neatly stacked. All of these operations are accomplished automatically.

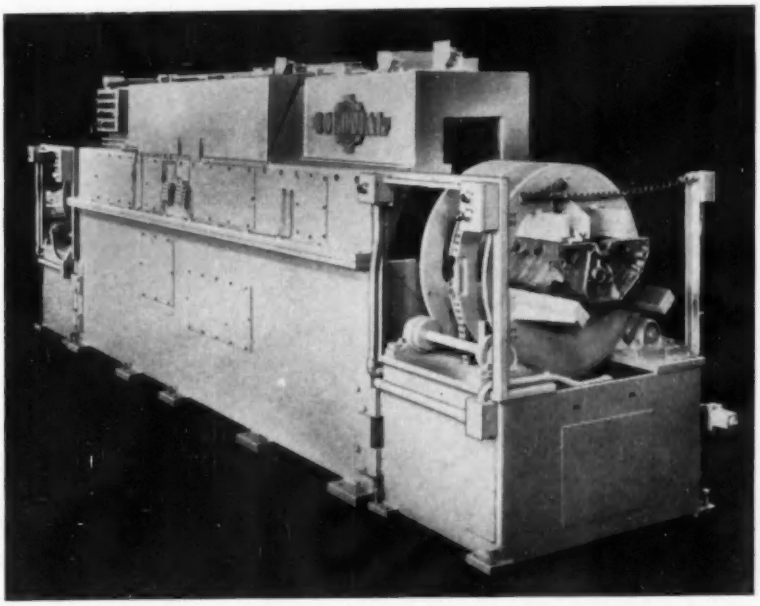
Circle 34 on postcard for more data

Cincinnati Auto-Shear—an automated sheared-blank production machine

COLONIAL BROACH & MACHINE CO.

BROACHING MACHINE — Colonial horizontal broaching machine, in a new "tunnel-type," uses overhead broaching and through-feeding to up output in automated-line processing of engine cylinder blocks. Parts are automatically fed to the machine through a turnover positioning unit for one-pass broaching by a hydraulic traveling ram. Transfer units progressively move the parts into an elevating station for broaching. In one application for processing 10 bearing surfaces of a cylinder block, an automatic cycle time of 29.5 sec was obtained with the six-ton, 54-in. stroke model of the machine. Cutting speed is 30 fpm. The overhead operation removes a maximum of 0.025 in. of stock in one pass, leaving a high-quality surface finish.

Circle 35 on postcard for more data

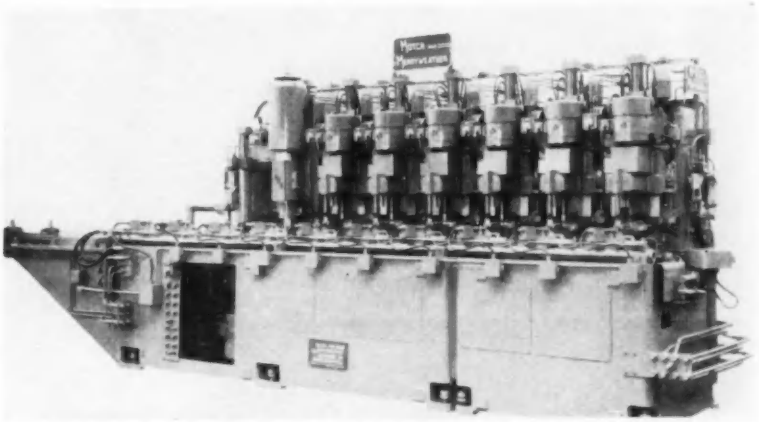


Colonial 6-ton, 54-in. stroke horizontal broaching machine, developed for processing cylinder blocks, is of a new "tunnel-type"

MOTCH & MERRYWEATHER MACHINERY CO.

TRANSFER MACHINE—M & M 11-station in-line transfer machine automatically performs nine drilling, reaming and milling operations on automotive pistons. It is capable of producing 650 pistons per hour at 100 per cent efficiency. In operation pistons are delivered dome side down to the first station by conveyor, where they are automatically accepted and loaded into the machine. Station-to-station transfer is accomplished by hydraulically-operated transfer fingers and a reciprocating transfer bar. After transfer to the second station, the piston is properly oriented in relation to pin bores and bosses by means of an electric eye and orienting table.

Circle 36 on postcard for more data

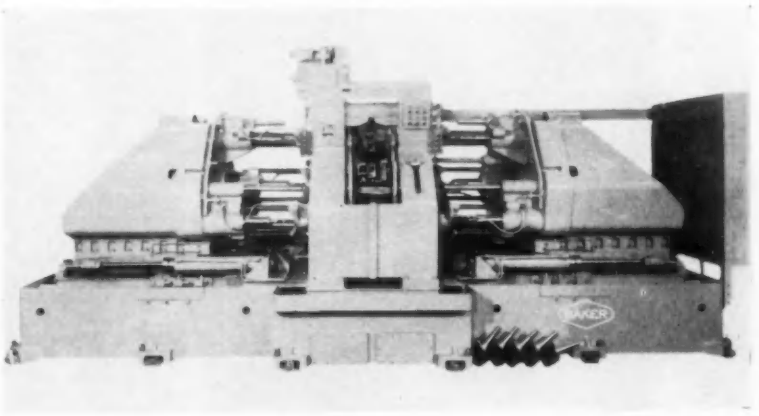


Motch & Merryweather 11-station in-line transfer machine automatically drills, reams and mills pistons, processing 650 per hour at 100 per cent efficiency

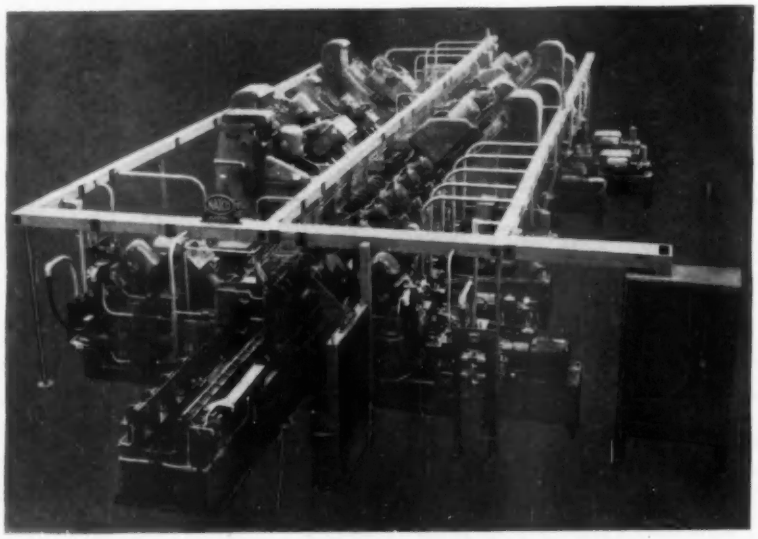
BAKER BROTHERS, INC.

FIVE-STATION MACHINE — Production of 52 forged steering knuckles per hour at 100 per cent efficiency is possible with this five-station trunnion-type machine, which performs core drilling and reaming in an automatic cycle. The heads are specially built, have a 15-hp bevel gear drive, and are mounted on Baker basic model 1830 standard slides. Twin-pull cylinders for feed are located on the outside of the slides. Hydraulic power is supplied by a separate package. Lubrication is centralized, automatic.

Circle 99 on postcard for more data



Baker five-station trunnion-type machine automatically drills and reams forged steering knuckles.



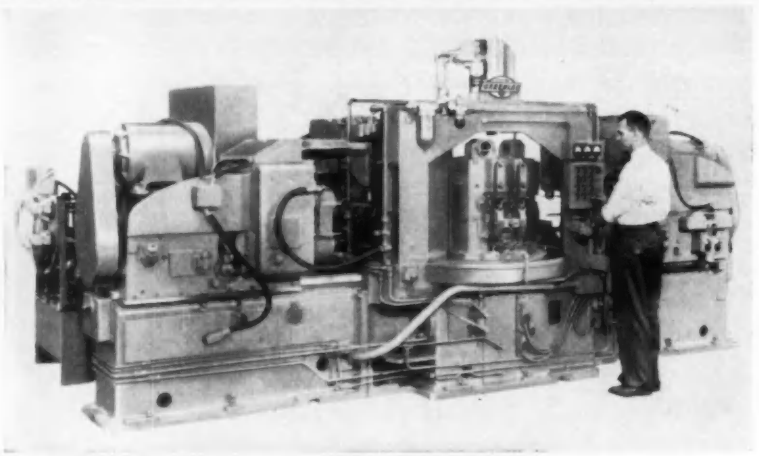
NATIONAL AUTOMATIC TOOL CO., INC.

TRANSFER MACHINE — Natco Holeway transfer machine processes 120 cylinder blocks per hour through 21 stations. Parts may easily be removed by dropping the guide rail at stations which operate on one side only. With pan face up, all necessory drilling and milling operations are completed on faces presented. A total of 56 operations are accomplished as

Natco Holeway transfer machine

the parts progress through the stations which comprise one loading, 13 machining, three idle, one rotating, one inspection (plugs check for broken drills and depth), one chip dumping, and one unloading. Since the part must be located from the top, it is elevated over fixed pins up against locating pads.

Circle 38 on postcard for more data



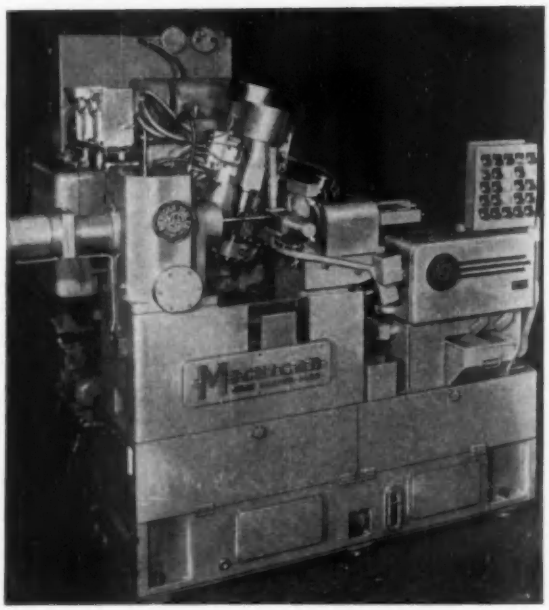
GREENLEE BROS. & CO.

FOUR-STATION UNIT — Greenlee three-way, four-station, horizontal, automatic indexing machine processes 84 Diesel engine connecting rods per hour at 100 per cent efficiency. Fixtures are manually loaded with two connecting rods and mounted on the index table located at first station.

Greenlee four-station indexing machine

The two rods are then automatically clamped into position by a built-in, air-operated torque wrench. Indexing from station to station is by a hydraulically-operated gear and rack mechanism. Piston pin holes are drilled, cap side of rod is bored, rod end is bored, bolt bosses are milled square, piston pin holes are semi-finish reamed, and a sawing operation separates cap from rod.

Circle 39 on postcard for more data



MICHIGAN TOOL CO.

GEAR HOBBER — Model 1433 high-speed small-gear hobber can be set up in tandem for a completely automatic hobbing line. Design provides automatic through-feeding and removal of parts. Gear washers and classifiers can be integrated into the machine units. Automatic size control is also provided. The horizontal, single-spindle machine will hob up to 12-pitch spur or helical gears. Maximum center distance hob arbor to work spindle is 3¼-in.; maximum crossfeed stroke of hob is 4-in.

Circle 37 on postcard for more data

RAYTHEON MFG. CO.

ULTRASONIC GRINDER—For machinable areas ranging from 0.002 to one-inch diameter, a low-cost, high-precision ultrasonic impact grinder is available. It utilizes ultrasonic energy to drill, slice, trepan, engrave and shape hard brittle materials, with tolerances to ±0.0007 in. and finish to eight microinches. Power source for the unit is 115-v ac, and water-cooling is not required. Bench mounted, the pedestal and driven unit is 23 by 16 by 15 in., and the driver 19 by 16 by 13 in. Weight is under 200 lb.

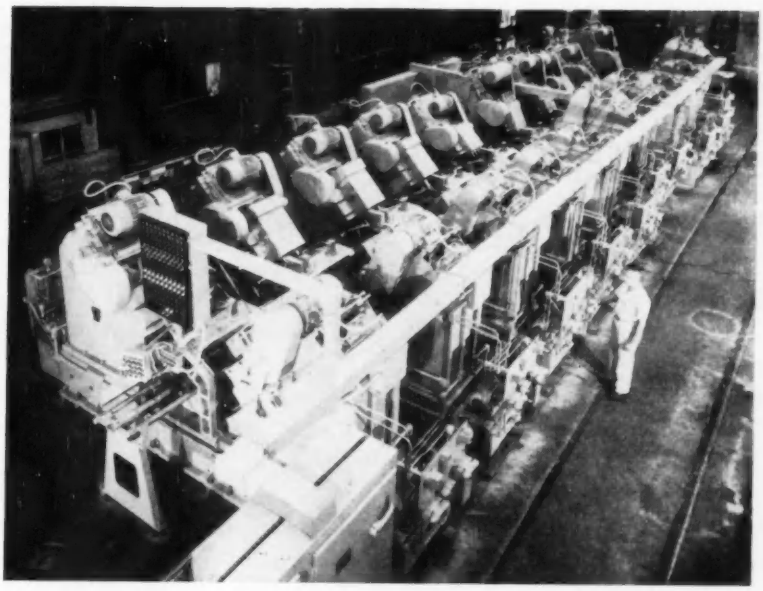
Circle 40 on postcard for more data

MOLINE TOOL CO.

TRANSFER MACHINE—Moline recently completed a 10-unit transfer machine designed for multiple machining operations on V-8 engine cylinder blocks for automobiles. As the workpiece passes through the various stations of the equipment the eight cylinders are rough bored, semi-finish bored and counterbored, and both ends of each cylinder are chamfered; also valve clearances are machined. All functions are tied together electrically so that the entire equipment can operate as an integrated machine. Control is centralized in one pushbutton station mounted on a movable arm which can be swung to either side of the feeder station at the beginning of the transfer line.

Circle 41 on postcard for more data

Moline 10-unit transfer machine ▶

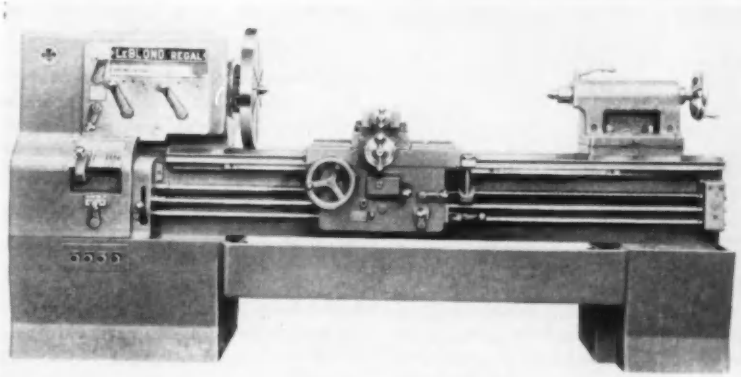


R. K. LEBLOND MACHINE TOOL CO.

LATHES—Large swing and 10 hp are featured in the introduction of two new LeBlond Regal lathes. Available in 21 and 24-in. swing sizes, both models can be obtained with standard 7½ hp or optional 10 hp for high speed ranges; electric clutch and brake feed reverse at the apron heat-treated gears in the head; and quick-change box and apron. Standard features include headstock with a combination gear-belt drive construction, bed with hardened and ground replaceable steel ways, three-bearing spindle, and rugged tailstock with plug clamping. General dimensions and construction details are patterned after the company's heavy-duty engine lathes, giving capacity, speeds and horsepower usually found only in heavier-type machines.

LeBlond Regal lathe available ▶

Circle 42 on postcard for more data



W. B. KNIGHT MACHINERY CO.

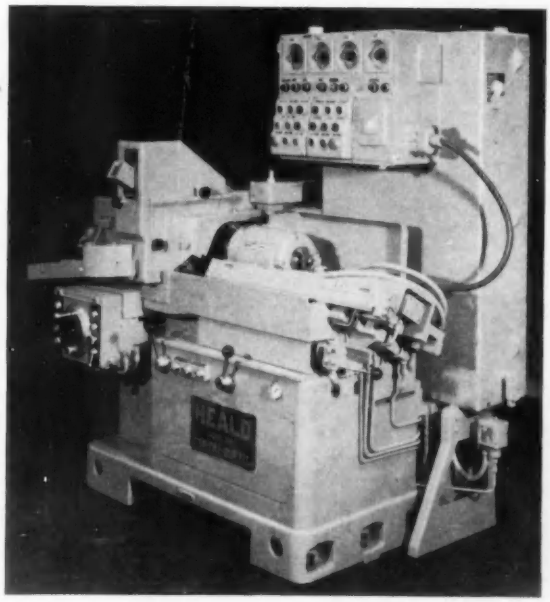
BORING, MILLING—Model No. 60 vertical precision boring and milling machine is built in two sizes. Vertical capacity is 30 in. on both machines. The smaller, with 18 by 52-in. bed-type table, has 18 in. cross travel and 28 in. longitudinal travel. The larger, with 18 by 60-in. table, has 18 in. cross and 36 in. longitudinal travel. The wide, fixed-type bed, equipped with three-way bearings, provides solid table support.

Circle 43 on postcard for more data

HEALD MACHINE CO.

INTERNAL GRINDER—An inclined table design is used in two Rite-Angle models of the Centri-Matic internal grinder: Model 190A (illustrated) for straight and taper boring, and Model 1901A for ball track grinding. Both are fully automatic machines for work up to 4½ in. OD requiring precision internal size and finish, such as anti-friction bearings, retainer rings, gear blanks, compressor rolls, bushings and similar parts. Maximum work length (standard) is 1½ in.; or 2 in. with special chutes.

Circle 44 on postcard for more data

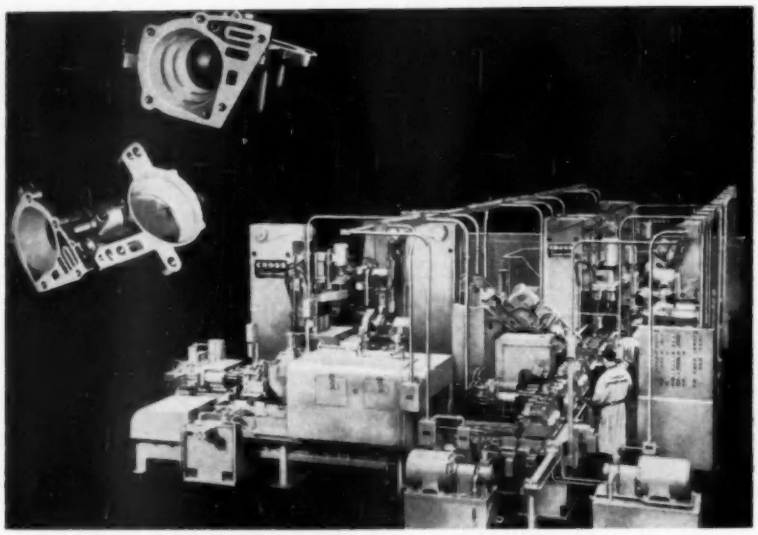


ROYAL MASTER, INC.

CENTERLESS GRINDER—Featuring versatility, the TG-12 centerless grinder is offered for the centerless grinding of tungsten carbides, steels, stainless, plastic, ceramics, carbon, fibre, cork, and nonferrous metals. Tolerances of ±0.0002-in. and finishes of 6 to 8 microinches are reported to be obtained. It handles work from 0.004 to 1½-in. diam.

Circle 45 on postcard for more data





Cross Transfer-matic completely machines automatic transmission servo valve bodies in 25 stations, producing 490 parts per hour at 100 per cent efficiency

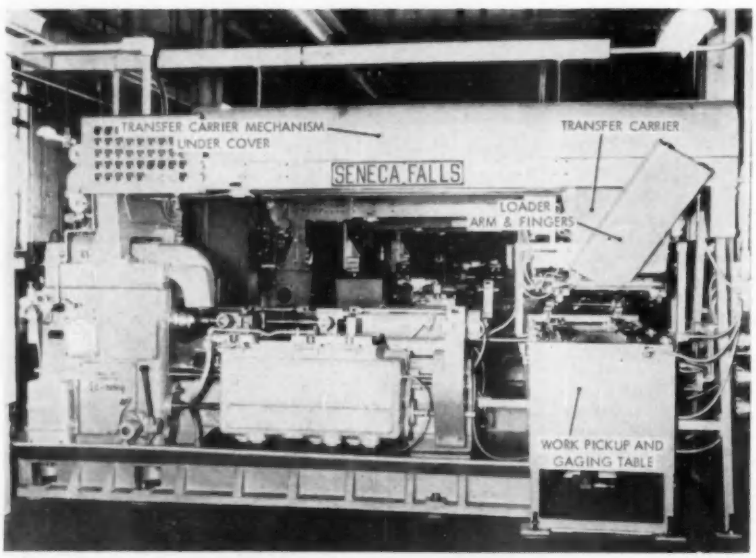
CROSS CO.

TRANSFER MACHINE—In machining servo valve bodies for automatic transmissions, a Cross Transfer-matic produces parts at the rate of 490 pieces per hour at 100 per cent efficiency. It performs 21 drilling, six reaming, five tapping, six boring, and two precision-facing operations. The parts travel through 25 stations. Palletized workholding fixtures each carry three parts. An unloading unit is provided for removing parts from fixtures and placing on a conveyor.

Circle 46 on postcard for more data

SENECA FALLS MACHINE CO.

AUTOMATED LATHES — Four Model AR Lo-Swing automatic lathes are used in an automated setup for rear axle shafts. The installation also comprises automatic gaging stations, work transfer and loading equipment, conveyor lines, mechanized chip conveyor, and control panel for coordinating the movements of the loading and transfer equipment. Production on each machine is timed for 180 shafts per hour at 100 per cent efficiency.



Automated installation of four Seneca Falls Model AR Lo-Swing lathes

Illustrated is the general layout of the four lathes which follow a straight line. The machines are adequately spaced to permit easy access for tool changing and also to provide room for the endless chain type conveyors which supply a bank of parts to each machine.

Instruments used in the automatic gaging stations indicate by lights whether the points of inspection are oversize, undersize or within tolerance. When all diameters are within specified tolerance, the workpiece is automatically released from the gaging station and deposited on the chain conveyor. If the part is oversize or undersize, it remains in the gaging station and the machine that produced the off-tolerance piece stops automatically. The tool setter then corrects setting, the off-tolerance piece is released by pushbutton, master control switch is depressed, and machine again operates on the automatic cycle.

Circle 47 on postcard for more data



SPECIAL MACHINERY CO., INC.

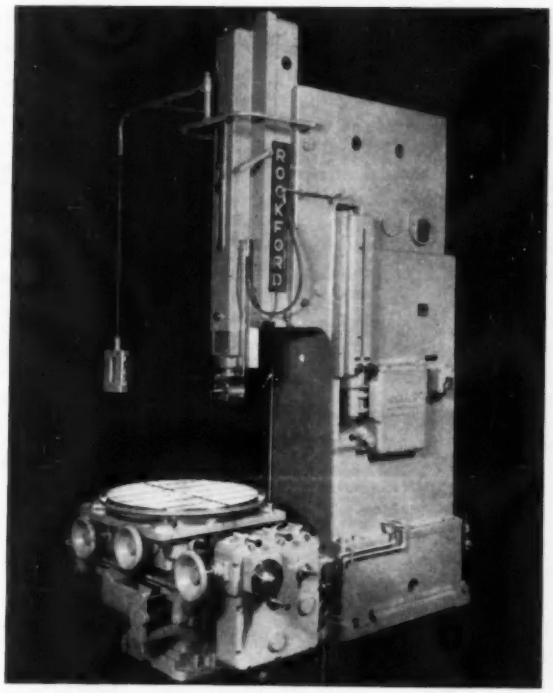
RADIUS CUTTER—Model 11 Radii is a specialized milling machine designed to mill the ends of square, rectangular, round or flat ferrous and non-ferrous metals, in sizes up to 1¼-in. thick by 2½-in. wide. All the operator does is insert workpiece into vise of machine, set gage to radius to be cut, adjust slide, clamp work, and start cutter. Chips are drawn through a hollow spindle housing by means of a blower, and are ejected through a chute into chip pan at rear.

Circle 48 on postcard for more data

ROCKFORD MACHINE TOOL CO.

HYDRAULIC SLOTTER — Rockford 36-in. stroke Model SA Hy-Draulic slotter features a unique combination of mechanical leverage and hydraulic control for the ram drive. Patented torque arm drive permits infinitely variable speeds between 40 and 100 fpm. Machine was designed for handling large work, irregular sections, internal surfaces, and angular and rotary cuts.

Circle 50 on postcard for more data



ENGELBERG HULLER CO.

BELT GRINDER — An automatic rotary, platen-type abrasive belt grinder, introduced for OD grinding of various materials, is designed to handle circular parts from 26- to 40-in. diam. It can be modified to meet other diameter ranges.

The motor-driven work table rotates at standard speeds of either ¾ or 3 rpm, with optional change gears for other rpm requirements. An air-controlled infeed mechanism carries the rotating parts in against the belt, and infeed travel is adjustable to a minimum of 0.0016-ipr. The table is adjustable from 0 to 45 deg for angular grinding.

For applications requiring deburring, such as stator rings or bucket wheels, a tampico brush attachment is provided. The brush is moved in against the belt-ground work by a manual control wheel, and can be swiveled to coincide with grinding angle of machine table.

Standard abrasive belt size is 8 by 107 in. Available belt speed varies from 2000 to 5000 sfpm depending upon application.

Circle 49 on postcard for more data

AUTOMATION DEVELOPMENT CORP.

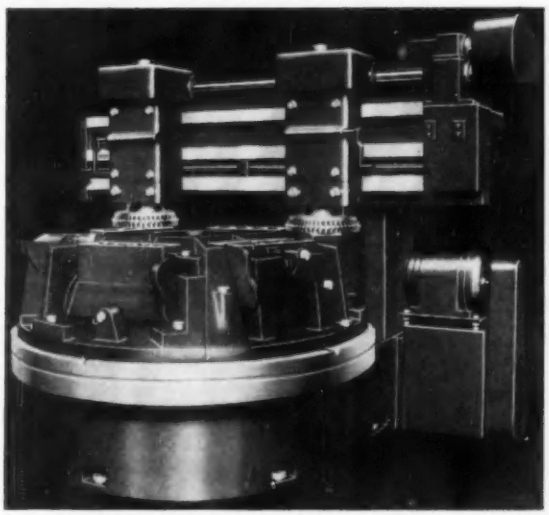
TAPPING MACHINE — An automatic tapping machine for small parts consists of a vertical tapping unit, a vibratory feeder, a gravity track, an escapement, a work feeder which positions and clamps the part in the tapping fixture, and an ejector mechanism which discharges the part into a chute. Production output is said to be over 1500 pieces per hour. The basic design may be modified, on special order, to adapt the machine to automatic drilling or assembling.

Circle 51 on postcard for more data

HAMILTON DIV., BALDWIN-LIMA-HAMILTON CORP.

MILLING—This vertical milling machine has circular table and twin spindles. Work is fed continuously in multiple setups to the milling cutters, and can be put on and taken off the machine while the table is moving. Spindle heads are independently adjustable vertically and horizontally, enabling operator in one pass to rough cut with one cutter and finish cut with the second, or to rough or finish on two levels in two different cutting circles.

Circle 52 on postcard for more data



MACHINE TOOLS

NORTON CO.

CYLINDRICAL GRINDER — The Norton 30-in. Type LCTU semi-automatic cylindrical grinding machine was developed for precision grinding of large, relatively light-weight workpieces. It is available in work lengths of 48, 72 and 96 in., and will handle pieces up to 30-in. diam. Automatic or manual wheel feed settings are speeded by means of a click-count feed index, with which feed increments as fine as 0.0001-in. in work diameter reduction may be set without visual attention. The automatic cycle is actuated with a single lever, and terminates either manually or by an electrically-timed control. Operation is also simplified by a preset table truing and grinding speed control.

Circle 53 on postcard for more data

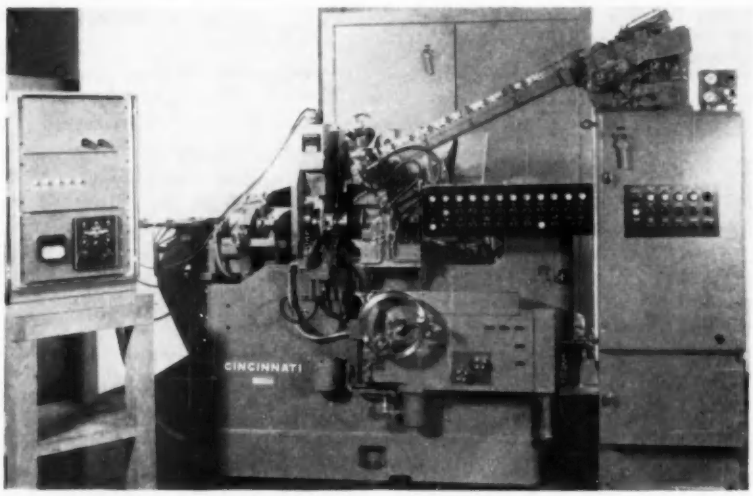


Norton Type LCTU cylindrical grinder for large, light-weight parts

CINCINNATI GRINDERS INC.

PISTON GRINDER—The Cincinnati Filmatic automatic piston relief grinding machine was developed to grind the elliptical skirt diameter on pistons. Operation is completely automatic, including workhandling, grinding, sizing, wheel truing, and repositioning for constant length of in-feed cycle. The latter feature, known as "cycle time stabilizer," is incorporated in Cincinnati's automatic air-electric gage sizing equipment. As the wheel wears, or is reduced in diameter by truing and dressing, the wheelhead is automatically re-positioned to maintain the original length of in-feed cycle and a consistent rate of production. The elliptical shape on the skirt diameter of the piston is generated by a cam grinding unit. Production output is 113 pistons per hour.

Circle 54 on postcard for more data



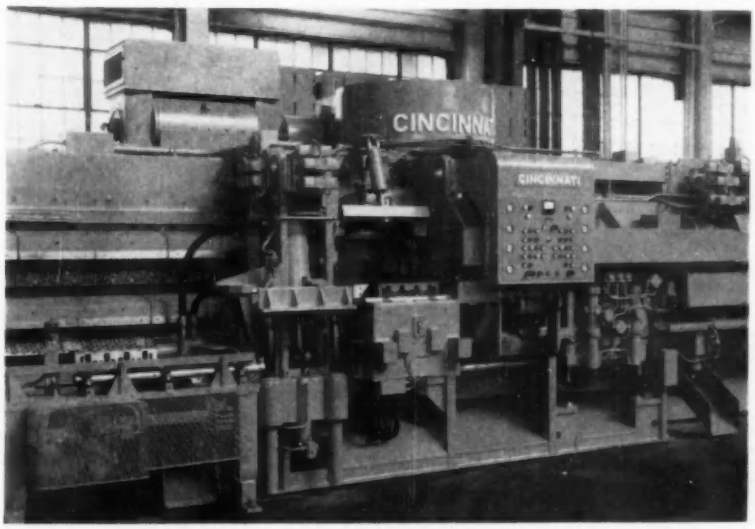
Cincinnati Filmatic automatic piston relief grinding machine



BARNES DRILL CO.

HONING MACHINE — BarnesdriL Model 320 special duplex type honing machine includes 20-in. hydraulic spindle stroke, fluid sizing, pneumatic hone expansion, refrigeration unit, magnetic separator, and Kleenall filter for honing four-inch ID cylinder bores of a V-8 engine block. Production is 72 cylinder blocks per hour at 80 per cent efficiency, in removing 0.002 to 0.003 in. stock and obtaining a 25 to 35 rms finish, while holding bore to bore within 0.0005 in., roundness 0.0005 in. and taper 0.0005 in.

Circle 55 on postcard for more data

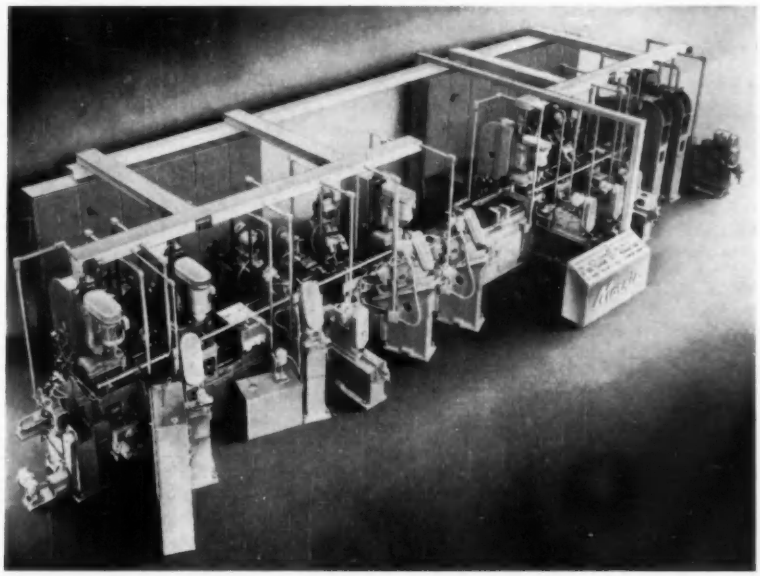


Cincinnati horizontal two-way machine tooled up to broach cylinder heads

CINCINNATI MILLING MACHINE CO., SPECIAL MACHINE TOOL DIV.

BROACHING MACHINE—The horizontal two-way broaching machine illustrated is typical of Cincinnati units being employed in the automotive industry for broaching flat surfaces of cylinder blocks and heads. This particular machine is tooled up to broach cylinder heads. Ram speeds are infinitely variable from 100 to 200 fpm, and powered through an electro-mechanical drive. It incorporates two fixture units and one roll-over unit. Main drive motors total 325 hp. Depending upon the cylinder head or block being broached, production may be as high as 130 parts per hour.

Circle 56 on postcard for more data



MORRIS MACHINE TOOL CO.

TRANSFER MACHINE — Designed to process two and four-barrel carburetor bodies, a Morris in-line transfer machine automatically completes one part every 7½ sec. Fourteen No. 1 Cam-matic, seven No. 2 Cam-matic and four Air-oilmatic drill units are used in performing 31 drilling, 19 boring, 10 reaming, 4 gaging, 13 probing and 13 tapping operations—a total of 90. The machine, with 56 stations, handles 480 parts per hour. Its automatic features include a loading section which checks parts and rejects those in improper position. Automatic loading and unloading are also provided in the center section, where automatic storage may be added. After machining, parts are automatically delivered to the unloading conveyor.

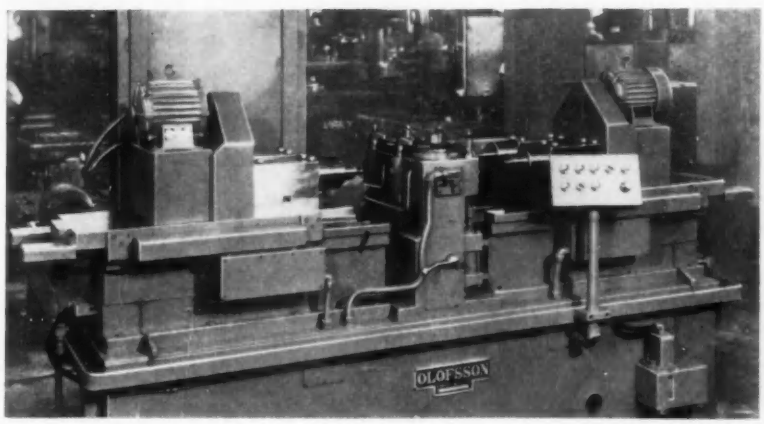
Circle 57 on postcard for more data

Morris in-line transfer machine has 56 stations, performs 90 operations, and processes 480 carburetor bodies per hour

OLOFSSON CORP.

BORING MACHINE—Designed for high-speed production, the Olofsson two-station double-end machine finish-bores two holes simultaneously in cast iron differential cases. Rate of production at 100 per cent efficiency is 250 cases per hour. Holes are bored straight and round within 0.0005-in. An elevator device provides a fast method for manual loading and unloading. The entire operating cycle is pushbutton controlled. Parts are unclamped automatically by hydraulically-operated finger clamps.

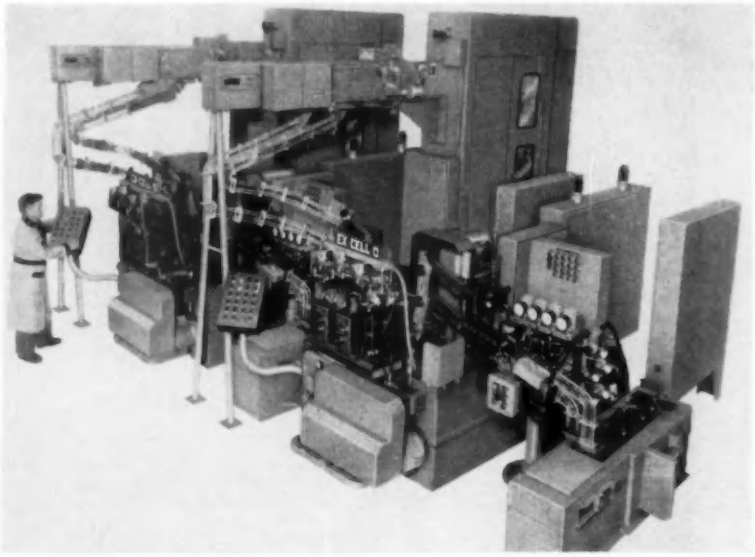
Circle 58 on postcard for more data



EX-CELL-O CORP.

AUTOMATED BORING UNITS — Special automation setup for processing steel gear blanks includes three gaging stations, two Gear-O-Mation storage-distribution units, and two Ex-Cell-O Style 312 cam-operated, precision boring machines. In addition to machining operations being fully automatic, parts loading and unloading, clamping, gaging, and tool adjustments are all automatically performed.

The first cam boring machine chemfers the outside rim and faces one side of the blank, as well as boring the ID and chamfering its edge. Gages check these operations and when parts approach either high or low limits, the gages effect required tool adjustments. At the second cam boring machine the ID of the workpiece is plunge-chamfered, the outside areas are faced and the rim chamfered, and the OD is turned. Again, the machined parts enter a gaging station as finished blanks and the gages effect necessary corrections for this stage of cutting. The parts then pass to subsequent stations of the machine in an automation line for tooth-cutting and final finishing operations.



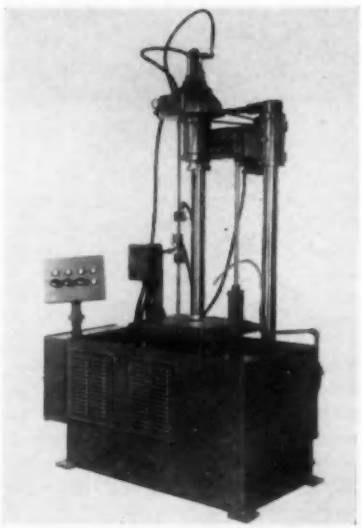
Ex-Cell-O cam boring machines in fully automatic setup which also includes gaging stations, tool adjustment and storage-distribution units

Circle 59 on postcard for more data

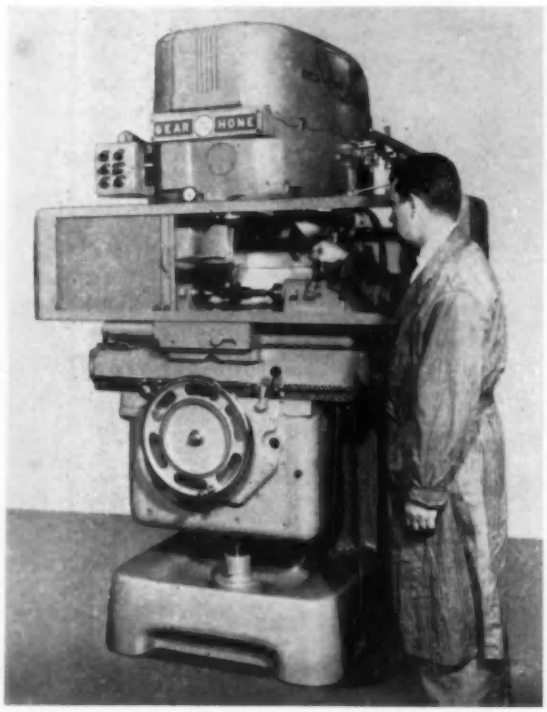
SUPERIOR HONE CORP.

HONING MACHINE — Model VA vertical-type production honing machine has a capacity up to 4-in. diam and 12-in. height. The speed of the V-belt driven spindle is infinitely adjustable from 225 to 550 rpm by means of a knob on the drive head. Adjustable limit switches control and set stroking lengths. Jogging switches on the control panel permit working in any desired section of the part without resetting the limit switches. The honing cycle is controlled by an electronic timer adjustable within a range of 6 to 120 sec.

Circle 60 on postcard for more data



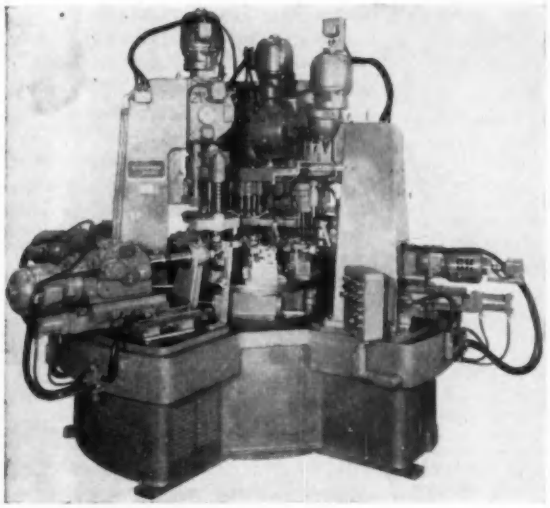
Superior Model VA honing machine



NATIONAL BROACH & MACHINE CO.

GEAR HONER— Model GHB Red Ring gear honing machine set up to hone an automatic transmission helical gear. Processing improves the sound qualities of hardened spur or helical gear teeth by removing nicks and burrs; correcting small heat-treatment errors in spacing, profile lead or eccentricity; and improving surface finish. The honing tool is essentially an abrasive-impregnated helical gear that is run in mesh with the hardened gear in crossed axes relationship, at high speed. Machine is shown arranged for manual loading, but is also adaptable to semi-automatic or fully automatic loading arrangements.

Circle 61 on postcard for more data



HARTFORD SPECIAL MACHINERY CO.

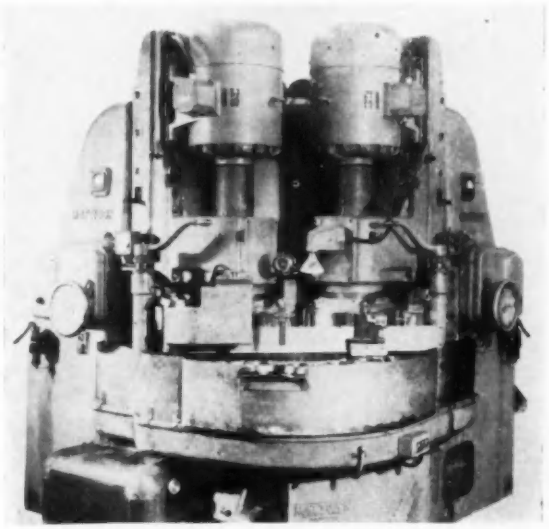
DRILLING, BORING— This six-station horizontal indexing drilling and boring machine is used to bore, face, hollow mill, drill and tap three different cast iron gear housings. Five cam feed drilling units, and two lead screw tapping units are employed to process the parts. Horizontal units are provided with side adjustment to handle left-hand parts. Production is 256 parts per hour at 100 per cent efficiency.

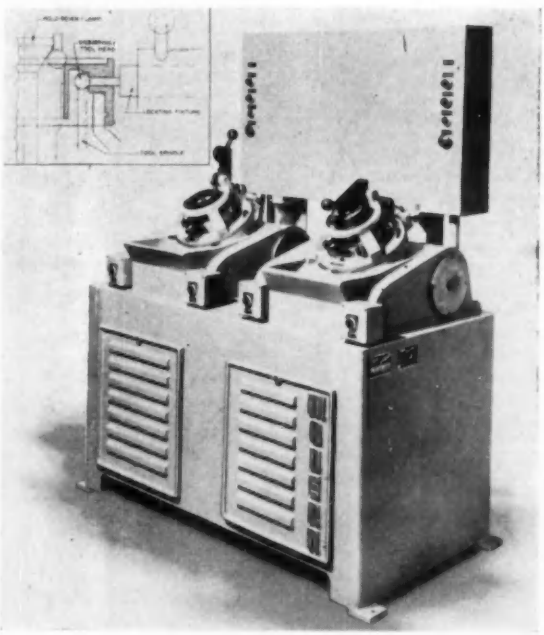
Circle 62 on postcard for more data

MATTISON MACHINE WORKS

GRINDER — Mattison No. 24-A2 rotary automatic surface grinder finish - machines clutch cones for automatic transmission. The only operation performed manually in the setup is the loading of work into the machine. From this point on, all functions including unloading of the finished work, are handled by automatic features built into the machine. Output is 385 clutch cones per hour.

Circle 64 on postcard for more data





MODERN INDUSTRIAL ENGINEERING CO.

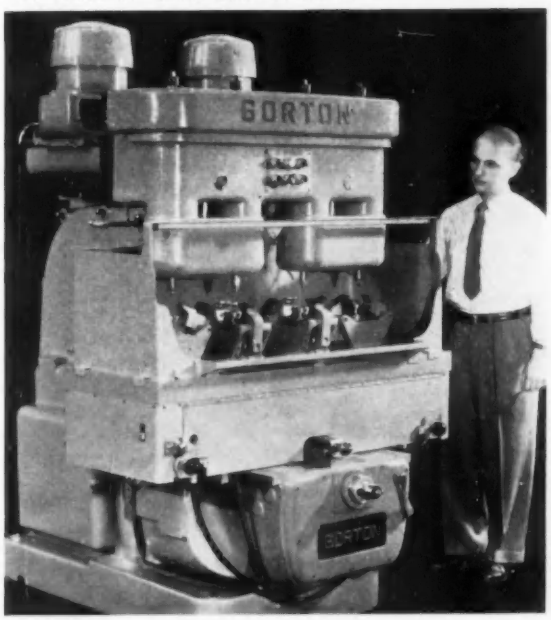
CHAMFERING—Special two-station Burr-Master functionally chamfers 20 blind holes on the internal diameter of a stator-blade piston for an automatic transmission. Functional chamfering was necessary to permit clearance for operation of a gate-like mechanical valve in each hole. Parts are semi - automatically positioned on the work spindle and wedged, then manually clamped. The rotary burr tool utilized is brought into contact at 90 deg to the work. Workpiece is automatically indexed for the complete work cycle. Output from both stations is 200 parts per hour.

Circle 63 on postcard for more data

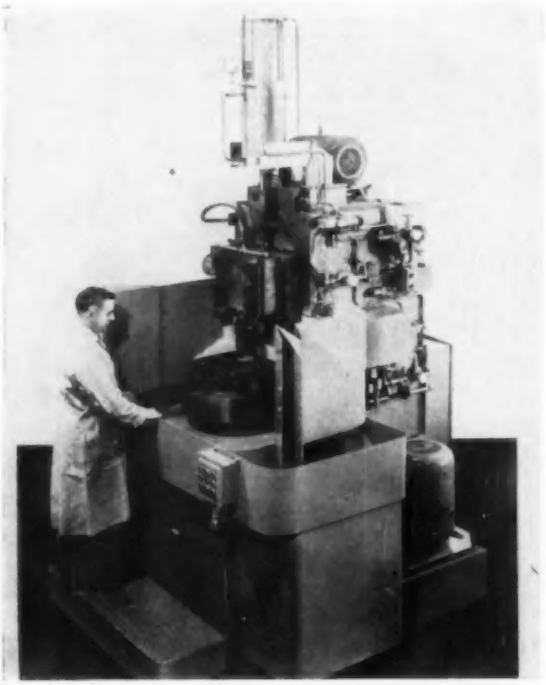
GEORGE GORTON MACHINE CO.

MILLING MACHINE —Gorton special four-spindle vertical milling machine, designed to mill out two recesses in bevel gear blanks about three inches in diameter. Production is 200 pieces per hour. It was tooled for a maximum centerline distance of four inches between recesses, but can be modified for varying distances. Other possible variations include incorporating a hydraulic valve to generate the profile either on the ID or OD of a piece part, as well as groove-type milling, keyway milling, face milling, either conventional or climb milling.

Circle 65 on postcard for more data



HOERN & DILTS DIV., NEW BRITAIN MACHINE CO.



SINGLE - STATION MACHINES — Series BL-1 are built to perform: contour turning, boring and facing; straight boring; surface grinding; surface honing; ID and OD grinding; contour milling; and horizontal or straight milling. Designed for work requiring rough and/or precision finishing operations, they utilize standardized cam-actuated heads to provide single automatic cycles of operation. This series is available in single or double spindle models. Options also include single, multiple or variable spindle speed drives; motor drives from 3 to 20 hp per spindle; and high lift slides for loading of extra large pieces.

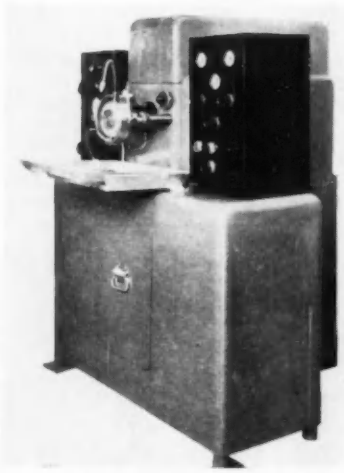
Circle 66 on postcard for more data

NATIONAL PIONEER, INC.

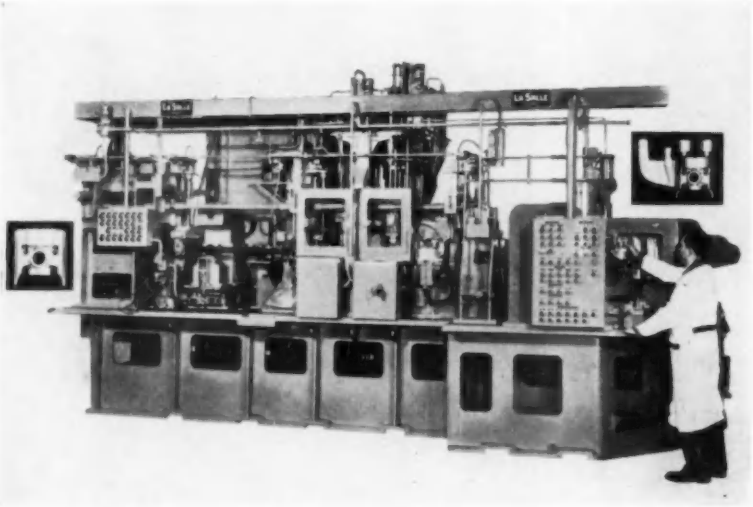
HONING MACHINE — Featuring feed and speed control from 100 to 1600 rpm using limit switches and variable speed motors, the Model S-6 honing machine offers instant selection of cutting speeds in the honing of precision parts. Limit switches control both the honing of the part and the usage of the honing stone. The same stone can be used to hog out stock and obtain a fine micro finish. Automatic loading of workpiece is another feature.

Cutting speeds start with a low rpm for roughing, and when the part is within a predetermined size a very high rpm automatically takes over for final finish. Automatic sizing ends the honing cycle when desired size is reached. Stone pressure control is also automatic for assuring the correct cutting pressure as determined by stone characteristics and part requirements. Stone feed-up is automatic and integral with the stone pressure control.

Circle 67 on postcard for more data



National S-6 horizontal type honing machine with automatic stroking and sizing



LaSalle combined dial type and in-line type machines form automated piston line

LASALLE TOOL, INC.

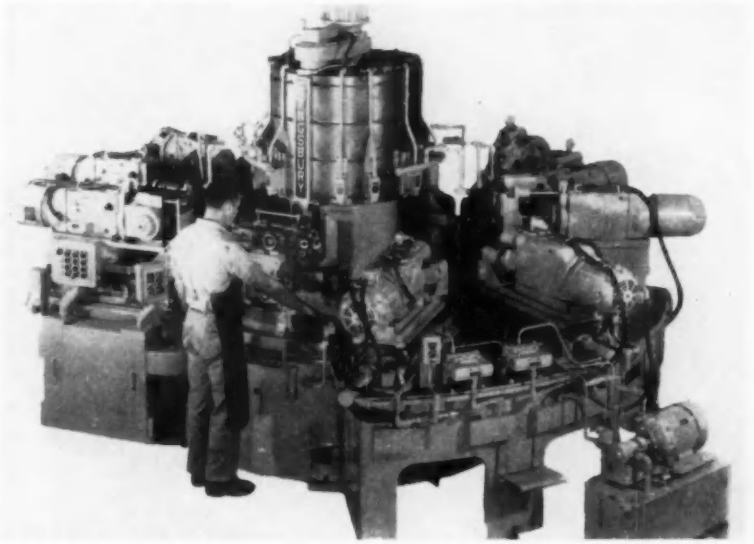
TRANSFER MACHINE—Combining a dial type machine and an in-line type machine to form a single unit, an automated piston line is fully automatic, with 14 stations. It is designed to produce 400 pistons per hour; and will handle any one of three different pistons by changing the position of the selector switch and fixture locators. Pistons as they come from the mold are fed by conveyor directly to the machine. Work operations consist of milling two gates and two risers off piston, piercing piston pin hole, two sides, hollow milling piston OD, facing head, facing and chamfering skirt, gaging OD of piston, weighing and classifying considering OD, and segregating by groups.

Circle 68 on postcard for more data

KINGSBURY MACHINE TOOL CORP.

DRILLING, TAPPING—Ten operations from six directions are performed on an aircraft drive housing by this indexing automatic. Because of the relatively low production rate required (18 parts per hour gross), the machine has only one work fixture. Each of the 10 units operates only when the work is at that station. Three of the units have hydraulic slides.

Circle 69 on postcard for more data



Kingsbury indexing automatic does 10 operations on an aircraft drive housing

EKSTROM, CARLSON & CO.

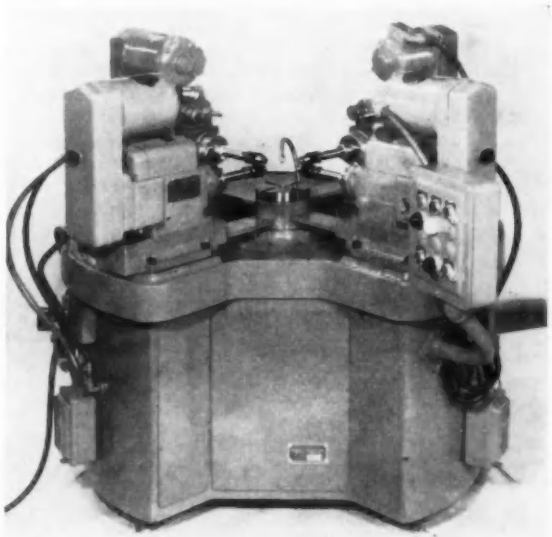
DEPTH, CONTOUR MILL — Model 480 radial-arm depth and contour mill provides a high-speed spindle and a cutter capable of routing difficult contours and milling various shapes to different depths. Parts applications include wing panels, doors, frames, ribs, spars, stiffeners and other airframe members. The No. 480 has a maximum arm extension of 120 in. from column center to spindle center and a 60 by 120-in. work table. The arms are so pivoted that they have an extensive swing at each joint, permitting the cutter to be moved all over the work table area and some distance beyond. An optional accessory is a canopy structure to which can be mounted an overhead template.

Circle 70 on postcard for more data

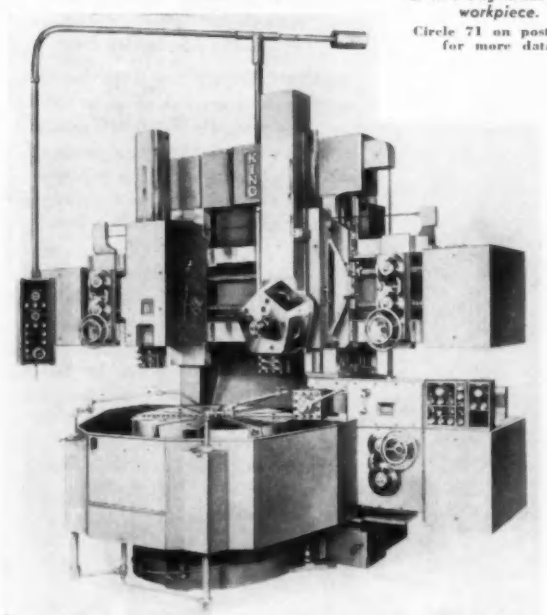
RUSSELL T. GILMAN, INC.

DRILLING MACHINE —Multiple operations can be performed with this automatic cross-drilling machine which has four horizontal drill heads. Operating sequence of the heads is controlled by a four-position rotary drum switch. The hydraulically-powered-feed drill heads can be positioned anywhere on an arc of 270 deg around the workpiece.

Circle 71 on postcard for more data



KING MACHINE TOOL DIV., AMERICAN STEEL FOUNDRIES



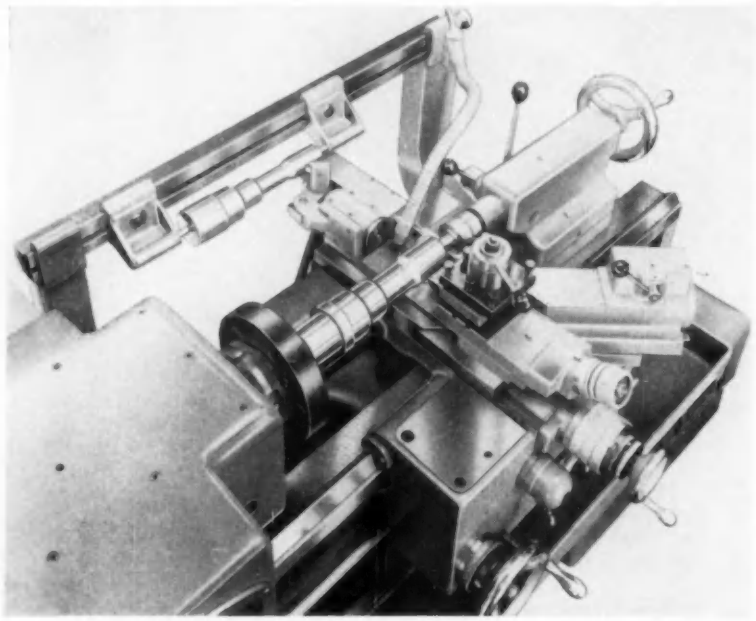
BORING, TURNING—Electrically-operated, the King vertical boring and turning machine illustrated is a 46-in. size with ram and turret head on rail, side head, and coolant pan. It is one model of a redesigned line available in sizes of 30-in., 36-in., 46-in., 56-in. and up with a variety of head combinations, with or without side head.

Circle 72 on postcard for more data

THE DoALL CO.

CONTOUR MACHINE — Model 5 contour machine is an articulated band sawing unit in which the work is held stationary and the cutting head moves. It has a work capacity of 70 sq ft and is capable of taking a straight cut 14½ ft long. Applications include: forming of large intricate contours; production of off-shaped parts by the stack; and the machining of large dies requiring big capacity and high accuracy.

Circle 73 on postcard for more data



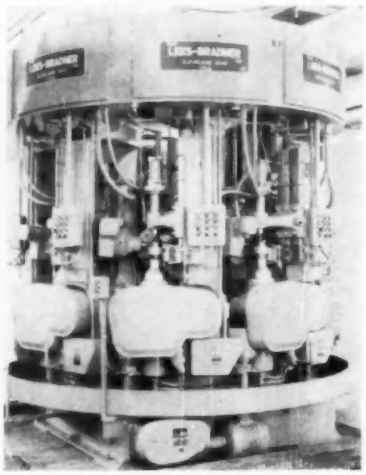
Lodge & Shipley 10-in. Hi-Turn lathe's 45-deg Copymatic tracer slide

LODGE & SHIPLEY CO.

TRACER LATHE—The 10-in. Hi-Turn with 45-deg Copymatic tracer slide provides all-hydraulic duplication. It can machine, with a single continuous cut, many combinations of diameters, tapers, bevels, contours, grooves, shoulders, necks, radii and chamfers, all automatically controlled from a template. Template supports are provided for either round or flat templates. The supports for round templates are standard, since this allows production of a prototype part by regular lathe operation. Supports for flat templates for either facing or turning are optional at extra cost. With the 45-deg Copymatic design, all control is given to the hydraulically-operated tracing slide; with the carriage operating at a constant, uninterrupted rate of feed.

Circle 74 on postcard for more data

LEES-BRADNER CO.



GEAR HOBBER—Latest model is this 7A eight-spindle rotary gear hobber. It is equipped with the company's new 3½-in. shift for the hob arbor in the new hob head which is designed to give the operator simple and positive control.

Circle 75 on postcard for more data



Gardner 2H30 grinds all four trunnion ends of universal joint spiders

GARDNER MACHINE CO.

DISK GRINDER — Gardner 2H30, 30-in. precision disk grinder grinds the four trunnion ends of universal joint spiders, two parallel ends at a time, with one handling. Output is 9600 ground surfaces (2400 complete parts) per hour at 100 per cent efficiency.

The rotary carrier, with 20 stations, automatically centers the spider in relation to the abrasive disk faces. An automatic transfer mechanism indexes the parts 90 deg after the first pair of ends has been ground. Parts are automatically transferred from the rotary carrier to the indexing carrier; and after indexing they are transferred back into the rotary carrier for grinding the other pair of ends. Ejecting fingers remove the finish-ground parts from the work stations.

Circle 76 on postcard for more data

CURTIS MACHINE DIV., CARBORUNDUM CO.

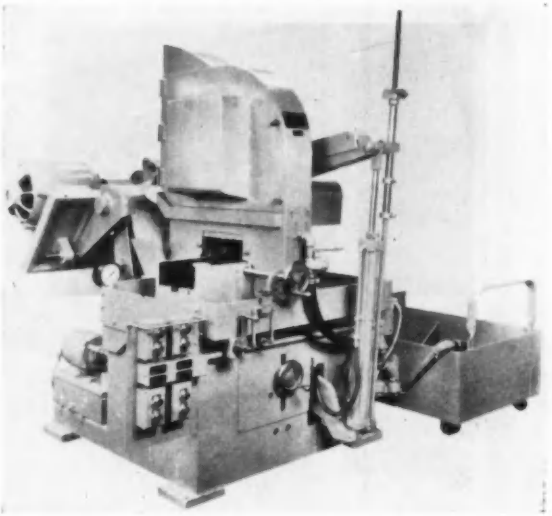
GRINDER, POLISHER — Model R-600C-3 Straight-O-Matic grinding and polishing machine is a unit employing three abrasive belts over one conveyor belt. It is equipped with wet grinding, oil mist applicator, automatic tracking, and pneumatic tensioning of the 10-in. wide abrasive belts. Operations made possible are a three-grit polishing sequence, a three-step stock removal for sizing, and combinations of polishing and grinding.

Circle 77 on postcard for more data

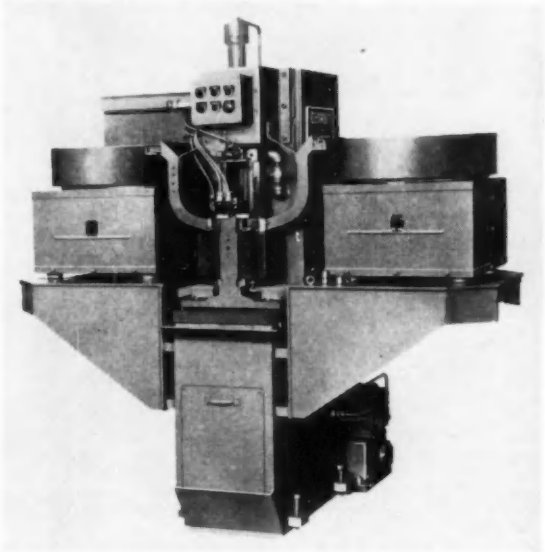
CAMPBELL MACHINE DIV., AMERICAN CHAIN & CABLE CO., INC.

CUTTING MACHINE — Campbell Model 481 wet abrasive cutting machine cuts bar stock, tubing and other shapes of practically any metal within its capacity of eight-inch square solids, with minimum of burr. It is an oscillating type machine in which the wheel feed and work clamps are hydraulically - operated and the work bar is hand-fed. Through its oscillating motion, wheel contact and pressure are materially reduced.

Circle 79 on postcard for more data



DETROIT BROACH & MACHINE CO.



BROACHING PRESS —This machine broaches a radius groove in both ends of two different length pinion gear blanks at the rate of 2080 pieces per hour. Operation is fully automatic. The blanks are loaded into hoppers on each side of the machine, positioned and loaded into feed magazines by vibration, pushed through stationary broaches by twin pushers attached to the hydraulic press ram, and unloaded automatically into ejection chutes.

Circle 96 on postcard for more data

BESLY-WELLES CORP.

GRINDER—Besly No. 240 is a double horizontal disk grinder applicable for high-speed precision finishing of piston rings, bearing rings, automatic transmission plates and similar parts. Parallelism can be held within 0.0001-in. Pushbutton controls are on both sides; head and disk alignment can be read at a glance. Other features include automatic pushbutton dressing, automatic sizing to adjust for disk wear, and fast magnetic rotary through-feed.

Circle 98 on postcard for more data

HOLE ENGINEERING SERVICE

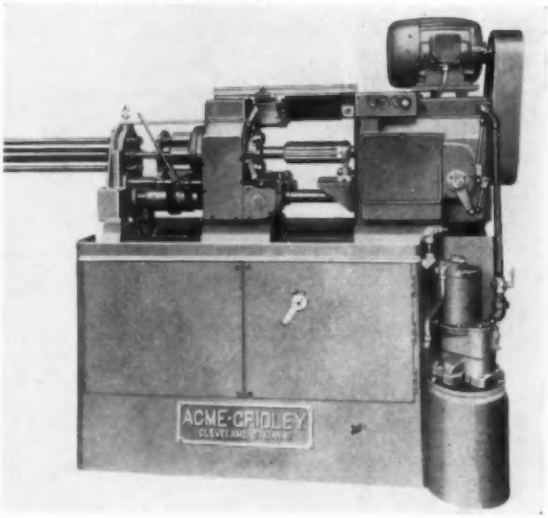
PISTON PROCESSING—Automatic in operation, a machine has been built which sizes and finishes the pin holes in pistons. The conveyor advances four pistons at a time with a 20-in. stroke, placing them first under a locating unit which rotates them to place the pin hole at right angles to the conveyor. The next station inserts a holder between the pin hole bosses and the four bearing-izers are passed through the pistons and withdrawn. Successive indexes bring the pistons in position for unloading onto a belt conveyor that carries them into an automatic weighing machine for sorting into three ranges. The cycle produces four pistons in eight sec, with accuracy for size to 0.0002-in.

Circle 78 on postcard for more data

NATIONAL ACME CO.

BAR AUTOMATIC — Acme-Gridley 7/16-in. RA-6 six spindle automatic bar machine developed for high-production runs of small parts such as metering jets, nozzles, setscrews and magneto parts. Special tooling includes attachments for threading, reaming, pickup and back burr, milling, and cross-drilling. Machine is arranged for spindle speeds up to 4500 rpm in standard models, up to 3200 rpm in models equipped with spindle stopping mechanism. Complete cycle is 0.7 sec at high speed.

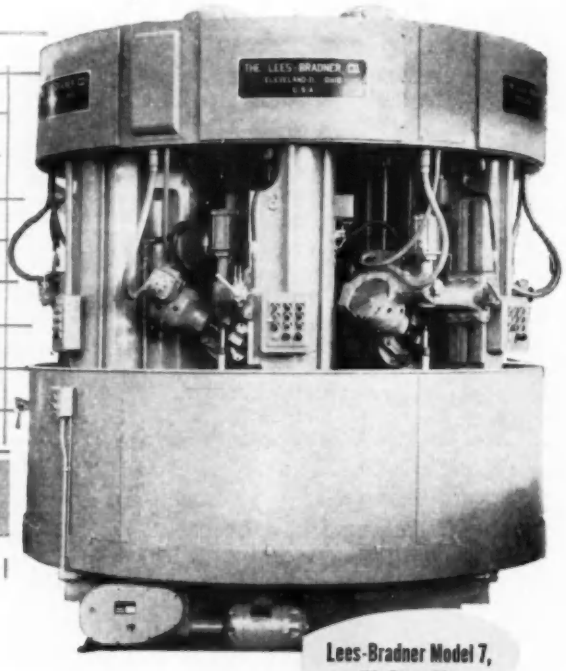
Circle 97 on postcard for more data



LEES-BRADNER

Sets the HOBBING pace for tomorrow

with 6 machines in 1

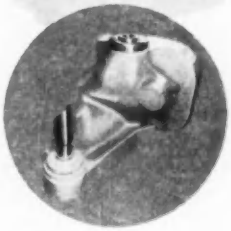


Lees-Bradner Model 7, HD 8" x 20" 6-Spindle Rotary Hobber. Also available in single and 4-spindle models.

Here's a complete hobbing production line in one space-saving unit. Actually the Lees-Bradner Model 7, HD 6-Spindle Hobber is six separate and independently operative machines in one. Each hobbing unit incorporates basically the same automatic, high-production features as the remarkable 7 HD Single Spindle Hobber. This includes a heavier, more rugged headstock, heavy-duty column and a 10 H. P. motor.

This amazingly efficient machine not only saves valuable floor space but, with its pushbutton controls and automatic features, actually controls the operator thus reducing the chance for human error or slowdown. Chips and coolant are easily carried away from the headstock by the elimination of flat surfaces.

So, if your manufacturing space is valuable and high unit production important, ask your Lees-Bradner representative to give you the story on the ultra-efficient 6-spindle rotary hobber. Write or wire us direct for his name and address in your area.



View of new HD headstock with increased bearing surface between column and headstock, heavier casting, coolant and chip carry-away.

8-Spindle 7-A Rotary Hobbers also available.

the LEES-BRADNER Company

CLEVELAND 11, OHIO, U.S.A.



MODEL 8 HOBBER HT THREAD MILLER 7-HD ROTARY HOBBERS CRI-DAN THREADING MACHINES MODEL 40 THREAD MILLER SH SPLINE HOBBER 12-S HOBBER

IF YOU THREAD OR HOB . . . GET A BETTER JOB WITH A LEES-BRADNER

FORD BUILDS FOR THE FUTURE WITH

CYPAK

... controlling form grinder sequencing in automatic transmission production

CYPAK* static controls have already outlasted conventional relays previously used at the Ford plant in Livonia, Michigan. No down time for control maintenance has been necessary with this highly repetitive operation in over 17 months!

Logic and sequencing control of two Springfield Machine Tool Co. form grinders is performed by CYPAK static control apparatus. CYPAK activates the solenoids of hydraulic valves controlling the grinder's feed cycle.

In machining the impeller housing of automatic transmissions, the operator places the workpiece in the chuck, presses the cycle button . . . and CYPAK does the rest . . . automatically.

For complete information about CYPAK call your Westinghouse representative, or write Westinghouse Electric Corp., Dept. B, P.O. Box 868, Pittsburgh 30, Pa.

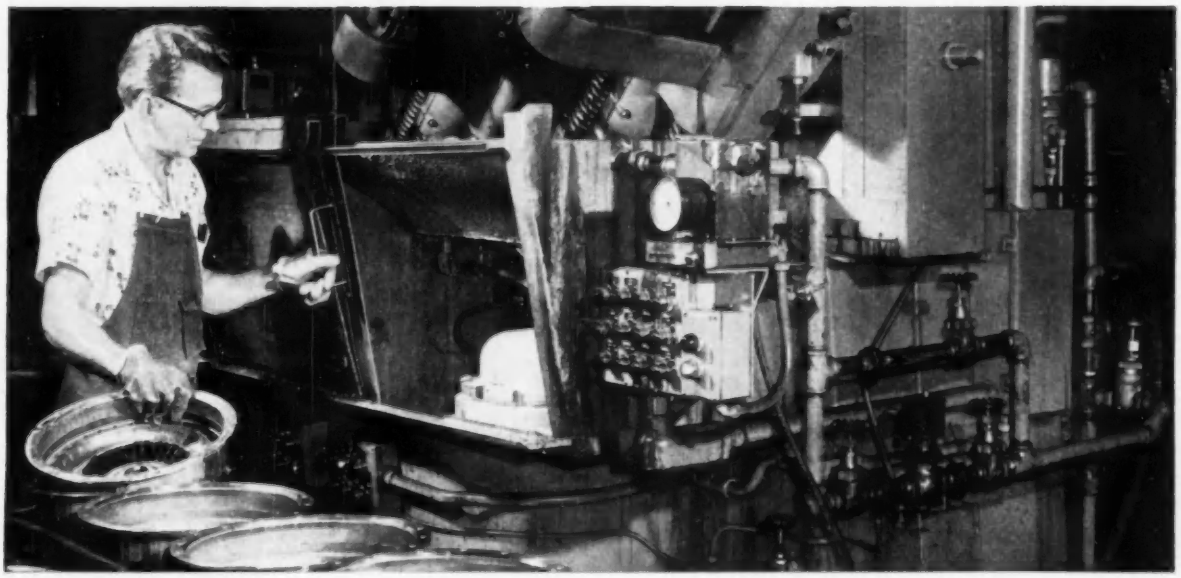
*Trade-Mark

J-22019

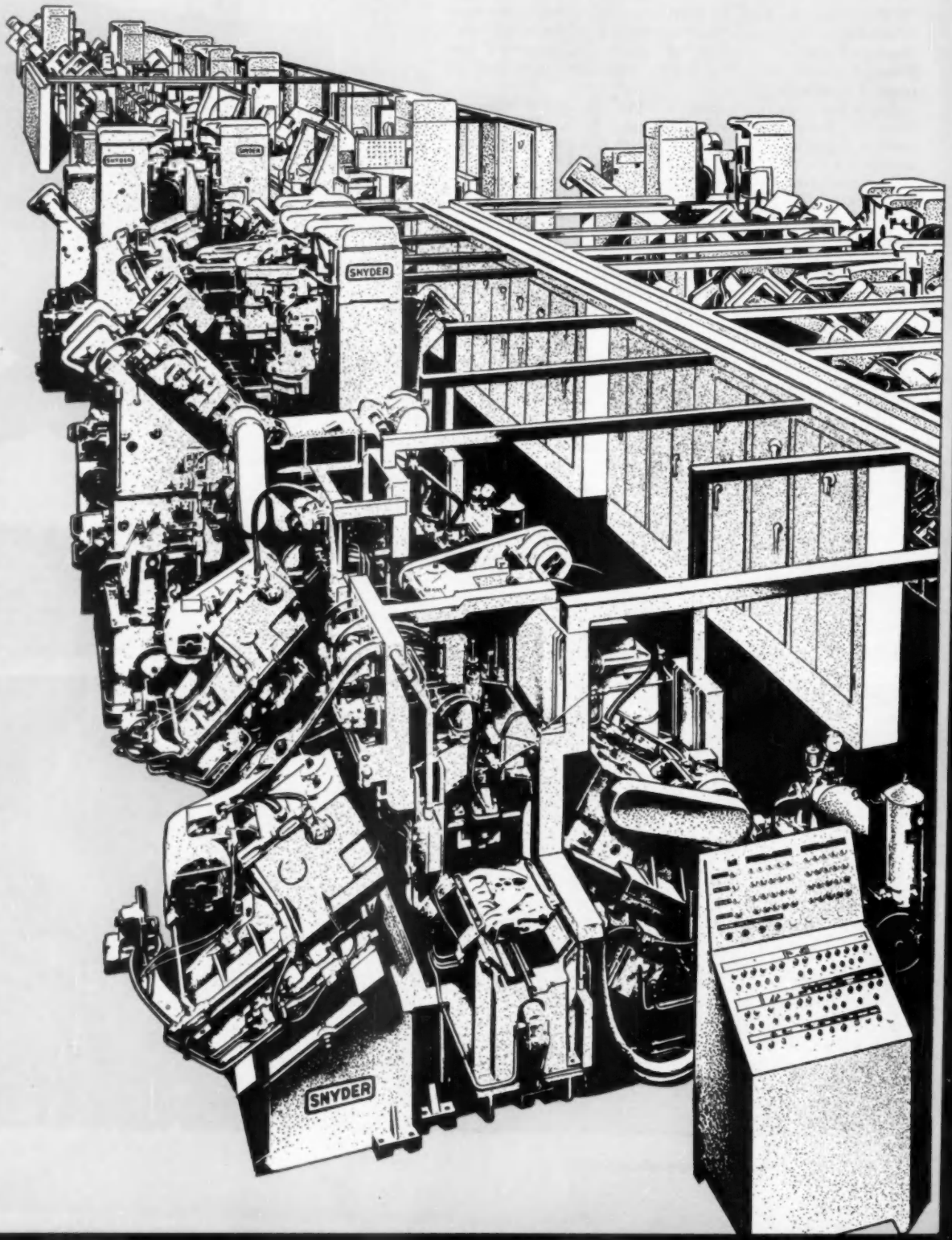
YOU CAN BE **SURE**... IF IT'S

Westinghouse





Unique Combination of Snyder Special Two or Four Barrel Intake Manifold

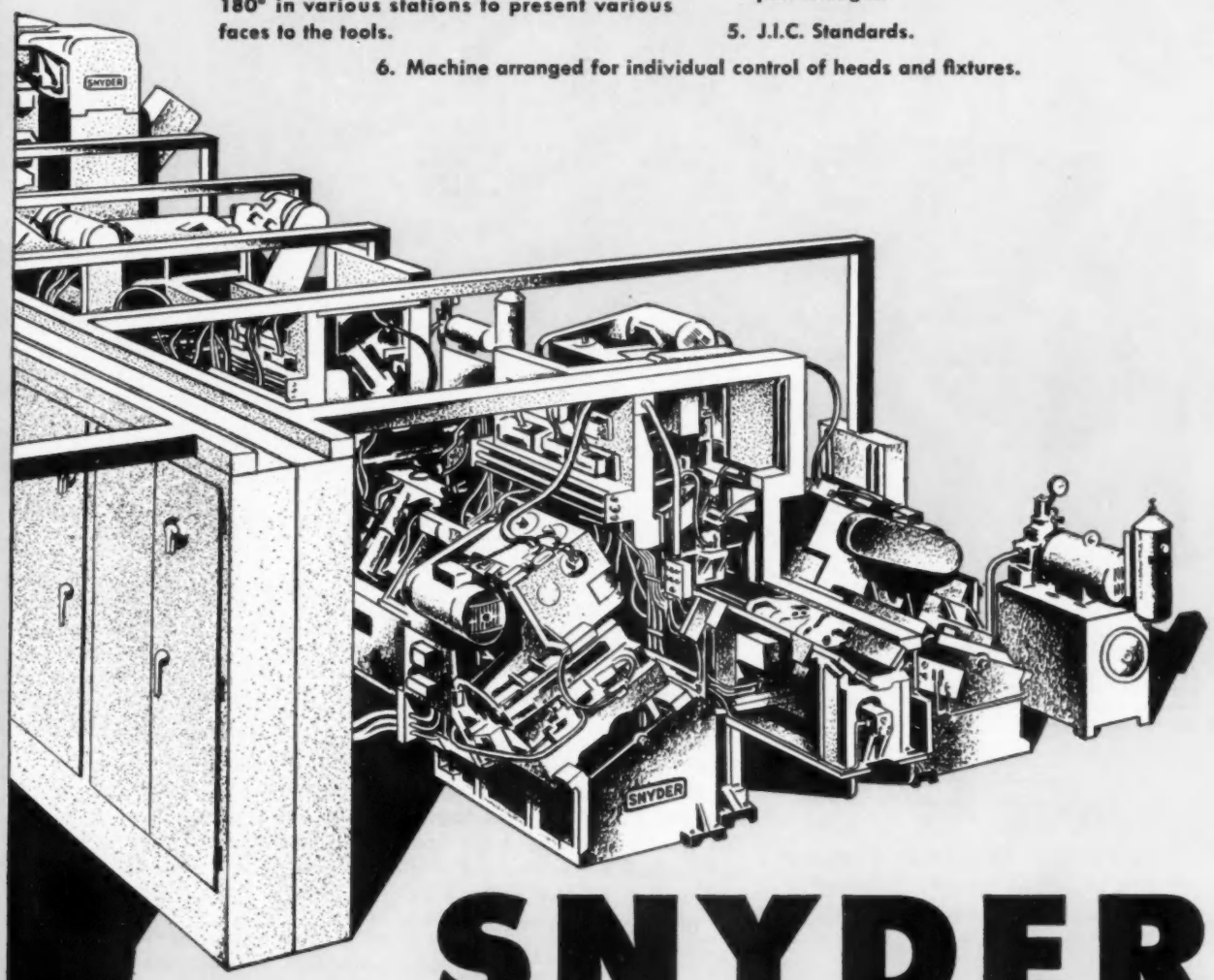


Transfer Machines Processes Either Castings from Rough to Finished Parts

Combination of two special transfer milling machines in parallel, with automation, feeding into one special transfer drilling machine gives production of 136 pieces per hour

Special Features of Snyder Machines Nos. 55-60 and 55-61

1. Machine line handles two or four barrel manifolds, random intermixed; sensing devices automatically instruct the proper drilling and tapping units.
2. Part rotated vertically 180° and horizontally 180° in various stations to present various faces to the tools.
3. Individual electrical panels and hydraulic units for each segment.
4. Wing bases, sections, spacers and risers standard throughout for easy adaptation to future part changes.
5. J.I.C. Standards.
6. Machine arranged for individual control of heads and fixtures.



SNYDER

TOOL & ENGINEERING COMPANY

3400 E. LAFAYETTE • DETROIT 7, MICHIGAN

32 Years of Special Machine Tools with Automation

A new MODERN process...



adhesive bonding with automatic control

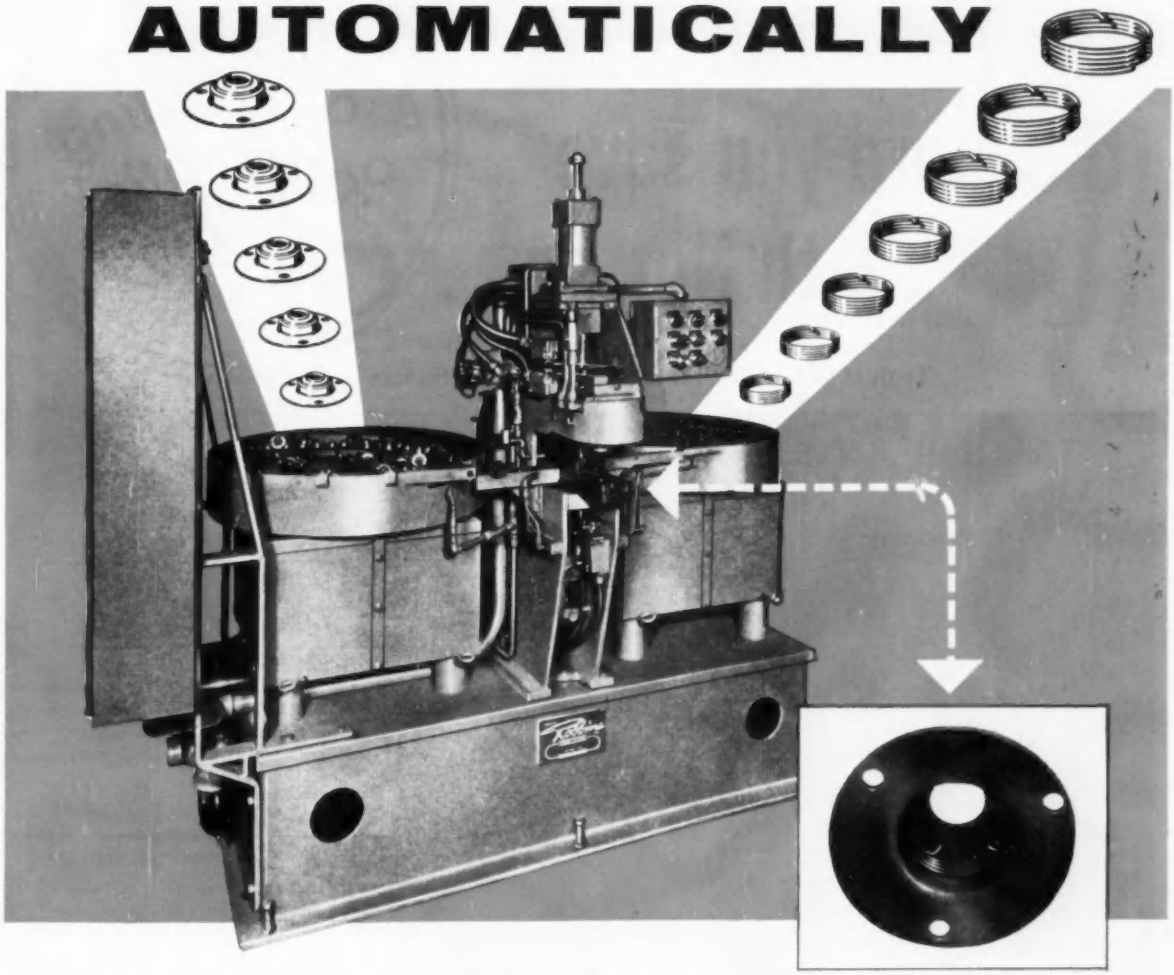
Shown here are Models No. 4CBS and 20CBR for bonding linings to metal cones of automatic transmissions. Custom-tailored fixtures adapt the machines to other automotive, aircraft, electrical and industrial applications.

MODERN'S Positive-Control bonding machines give you peak control efficiency over all prime factors—time, temperature and pressure. Lets you tailor output to needs. An adhesive curing process that can be used for bonding any two parent bodies together with adhesive agents. The machines range from fixed single-station to rotary forty-station types and automatically control the variables of bonding to any desired degree of absolute control. For full details, write for our new Bulletin CB-1.

MODERN®
Industrial Engineering Co.
14230 BIRWOOD AVE., DETROIT 38, MICHIGAN

FEEDS, POSITIONS, ASSEMBLES, UNLOADS

AUTOMATICALLY



1,440 INTRICATE SPRING-STAMPING ASSEMBLIES PRODUCED EVERY HOUR!

An automatic machine that installs *coil springs?* Right! . . . it's the new Robbins "Assemblimatic" Twin Feed Special. Two parts, a spring and stamped housing for an automotive window regulator, are hopper-fed into a hat-shaped track . . . housing open side up. The spring is fed over it, compressed and pressed into place. A second ram holds the spring . . . the housing is rotated until spring end is properly located in relation to housing holes . . . the finished assembly is unloaded, *at the rate of 1,440 assemblies per hour at 90% efficiency.*

In addition to completely automatic operation the machine features: electronic production control; automatic lubrication; hardened and ground ways; electrical and pneumatic equipment to J.I.C. standards, and *compactness* . . . the machine measures 82″ wide x 38″ deep x 70″ high and weighs less than 5,000 pounds.

Robbins "Assemblimatic" Machines are, *in fact*, the right answer to a wide range of assembly problems. They have cut manpower requirements, increased production, improved quality, reduced scrap in many mass production operations . . . and, chances are they can do the same for you. Find out now! Call in a Robbins special assembly machine engineer today, or send part prints for detailed recommendations.



New brochure describes and illustrates a variety of Robbins special assembly machines. Write for your copy today.

We offer complete facilities and qualified personnel to undertake special development projects.

OMER E. ROBBINS COMPANY
24798 PLYMOUTH ROAD • DETROIT 39, MICH.

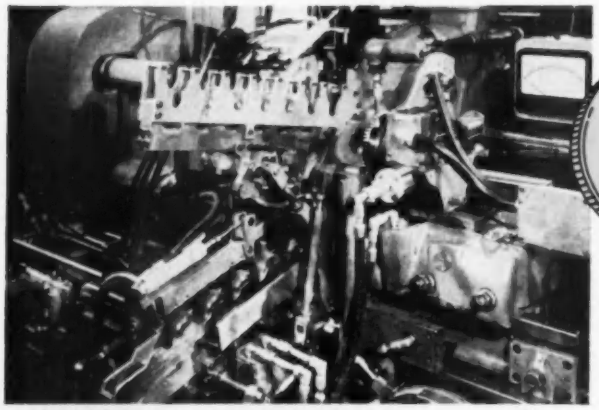
Robbins

SPECIAL MACHINES

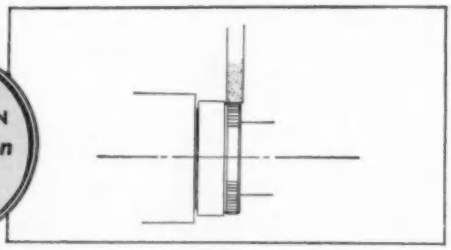
The more you grind the more you save with Norton...

cost-cutting automatic operations

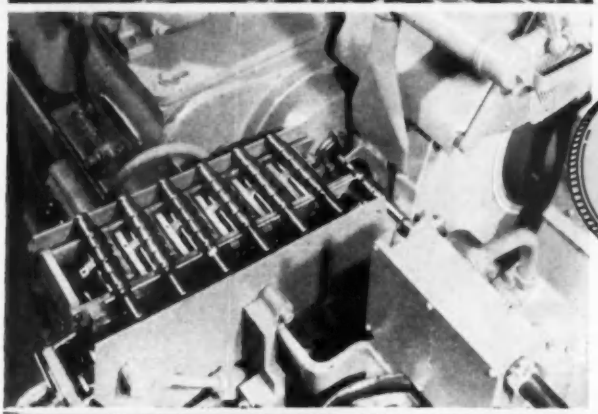
Typical automatic features on Norton grinders



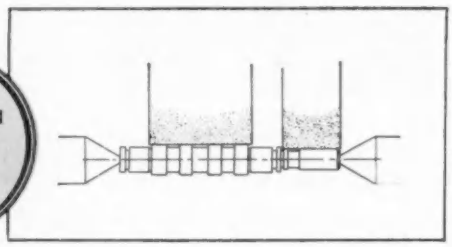
SAVINGS ON *Transmission Gears*



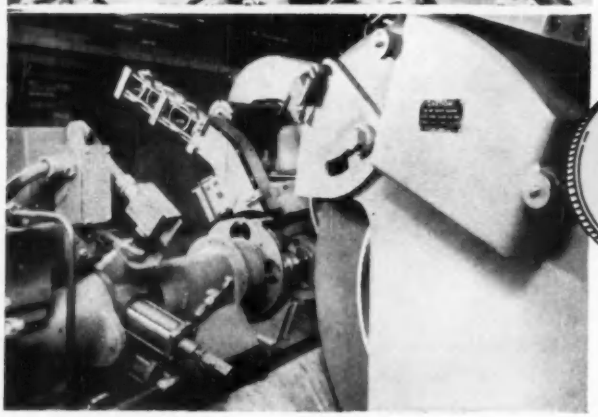
In a Type CTU Cylindrical Grinder arranged for completely automatic loading, grinding, and unloading of transmission gears, the part is held on a chuck and grinding cycle is terminated by an automatic air-electric grinding gage that signals when work is to size.



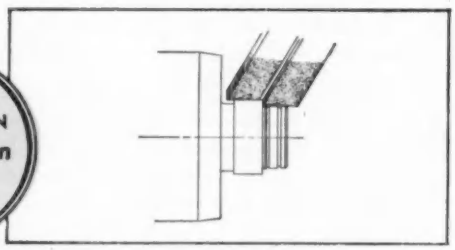
SAVINGS ON *Valve Pistons*



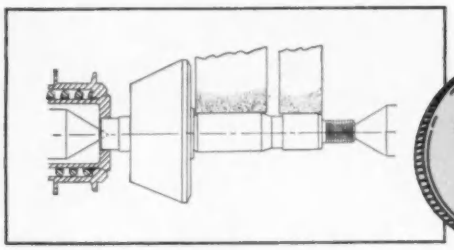
When a Type CTU Grinder is arranged for fully automatic loading and grinding of valve pistons the part is held on centers and driven by a floating type collet. Work is ground by a double-wheel mount.



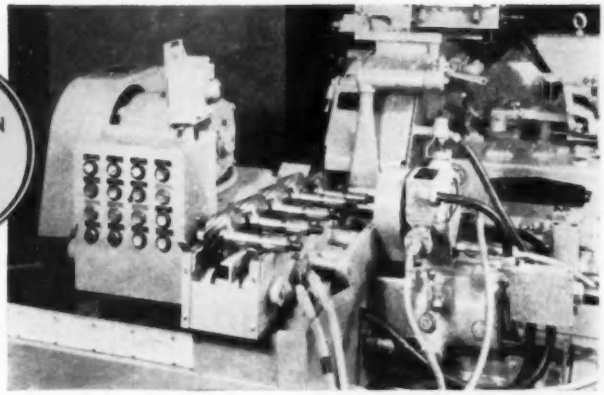
SAVINGS ON *Transmission Sleeves*



On this Type CV-4 Angular Wheelslide Grinder chucked grinding of transmission sleeves is arranged in a completely automatic cycle. Longitudinal movement of a revolving turret loads the machine. A stripper type plate removes the piece when turret retracts as the grind is terminated by electrically timed control.



SAVINGS ON *Stem Pinions*



The Stem Pinion Grinder reduces time and effort with a completely automatic cycle, electrically timed arrangement for grinding these hard-to-handle parts. Progressive escapements in the automatic loading mechanism release the parts in succession, avoiding gear mesh.

NEW ECONOMY!

Norton No. 2 Unitized Transfer Grinder Grinds Crankpins Automatically

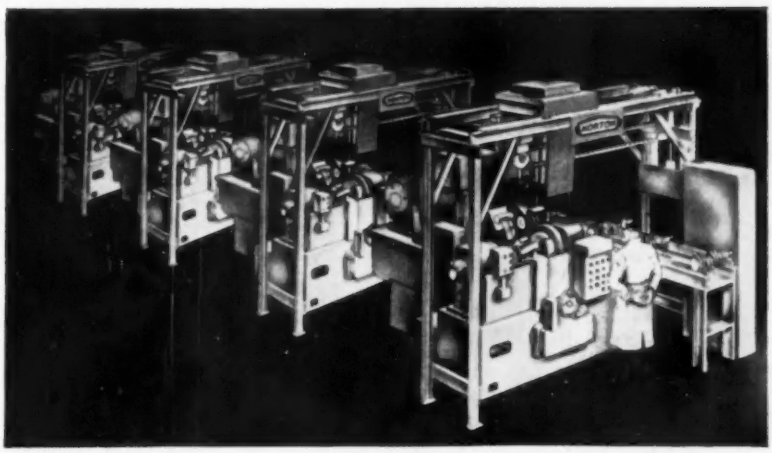
Here's a newly developed machine that automatically grinds crankpins faster and for less money than ever before possible. Advanced features like the following are reasons why:

Unitized Operation. Each grinding station, operating independently, can be automatically by-passed without affecting continuous production.

New Transfer Mechanism. Double set of hooks speeds loading, unloading and transferring of crankshafts from one grinding unit to another.

Fast Production. Cycling grinds 240 crankpins on 60 V-8 crankshafts per hour, due to many automatic operations.

Only One Operator Needed. Others are freed for different jobs. And the machine reduces floor-space requirements.



Norton has developed a wide range of fast, automatic grinders. You can get them in conventional and angular wheelslide types — also in special types for grinding automotive valve faces and crankshaft pins.

Remember: only Norton offers you such long experience in both grinding machines and wheels to bring you the "Touch of Gold" that helps you produce more at lower cost.

For further information about these machines — including how the No. 2 Unitized Transfer Crankpin Grinder can save you many dollars daily — contact your Norton Representative. Or write to NORTON COMPANY, Machine Division, Worcester 6, Mass.

District Offices:
Worcester • Hartford • Cleveland • Chicago • Detroit

To Economize, Modernize with NEW

NORTON

GRINDERS and LAPPERS

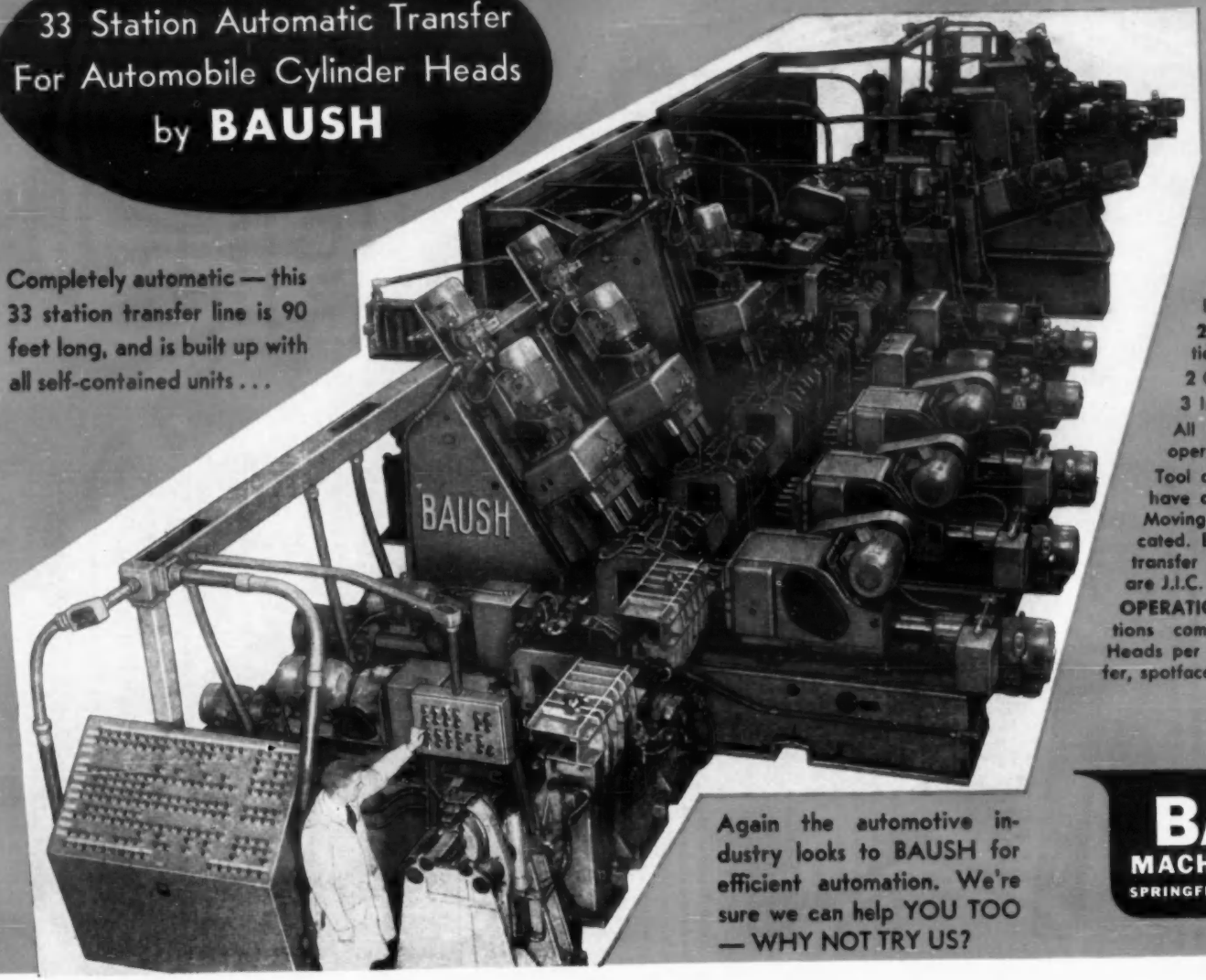
Making better products... to make your products better

NORTON PRODUCTS:
Abrasives • Grinding Wheels • Grinding Machines • Refractories

BEHR-MANNING DIVISION:
Coated Abrasives • Sharpening Stones • Behr-cat Tapes

15,600 operations per hour, with

33 Station Automatic Transfer For Automobile Cylinder Heads by BAUSH



Completely automatic — this 33 station transfer line is 90 feet long, and is built up with all self-contained units . . .

8 Horizontal "S" Mechanical Lead Screw Units

6 Vertical Angular "S" Mechanical Lead Screw Untis

4 Inverted Angular Mechanical Lead Screw Units

4 Horizontal "M" Mechanical Lead Screw Units

8 Vertical Angular Hydraulic Units

2 Probe and Blow-out Stations

2 Checking Units

3 Indexing Fixtures

All clamping and unclamping operations done hydraulically.

Tool changing and maintenance have ample room between units. Moving parts automatically lubricated. Detector system throughout transfer and all electrical controls are J.I.C. Standards.

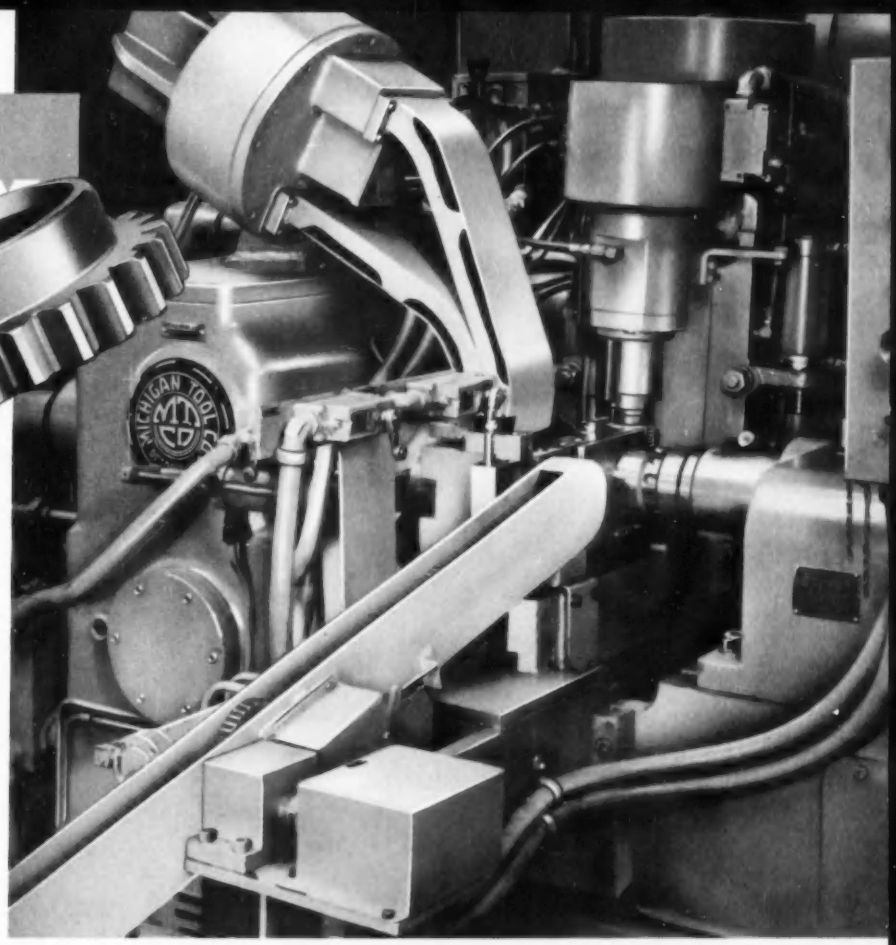
OPERATIONS: 156 cutting operations completed on 100 Cylinder Heads per hour — drill, ream, chamfer, spotface, mill pads and end mill.

Again the automotive industry looks to BAUSH for efficient automation. We're sure we can help YOU TOO — WHY NOT TRY US?

BAUSH
MACHINE TOOL CO.
SPRINGFIELD 7, MASSACHUSETTS

This Month's

GEAR PIX

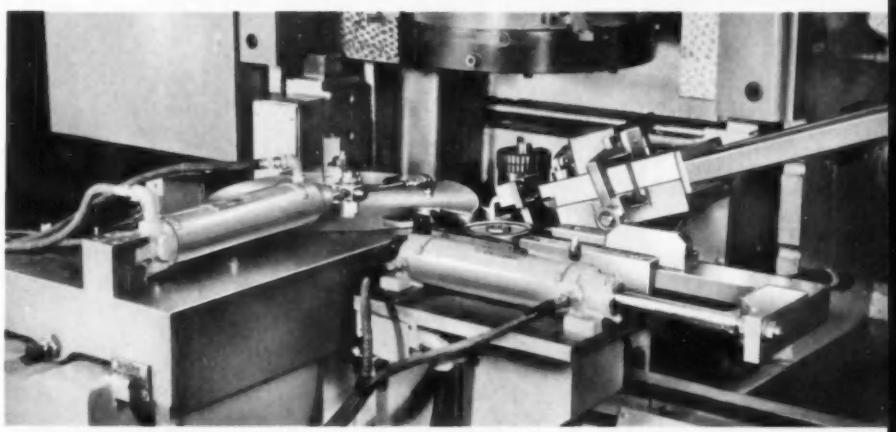


NEW MICHIGAN ORIENTOR MAKES BACK-TO-BACK HOBBING A NATURAL

Even on parts like this flanged pump gear, you can get multiple-spindle capacity from your high-speed Michigan single-spindle hobber. The new Michigan orientor reverses every other gear and thus positions two parts back-to-back as they go into the gear hobber. Total loading time for the fully automatic cycle is only four seconds for the two gears. Ask for details on the No. 1445 hobber.

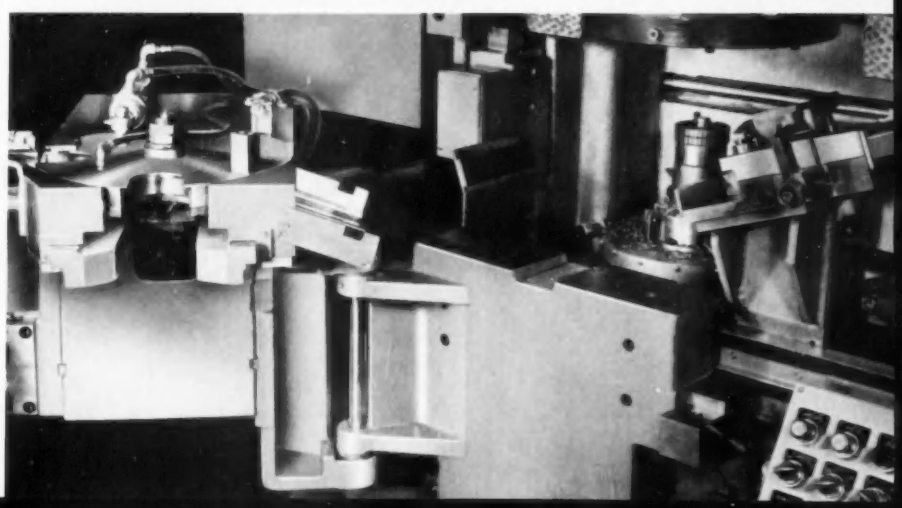
AUTOMATION BOOSTS SHEAR-SPEED RATE TO 180 PER HOUR

Automatic two-at-a-time parts loading and unloading has this Model 1853 Shear-Speed running at 100% efficiency producing 180 clutch hubs per hour. The work? A 36-tooth involute spline on a face width of .580 inches with a diametral pitch of 9.750. Pressure angle is 14½°. Parts are automatically positioned in pairs, fed, advanced, indexed 90° and picked up on a hydraulic arbor. Loading time is 8 seconds. Automatic cutting cycle for both parts is 32 seconds.



AUTOMATION SWINGS CLEAR FOR TOOL CHANGE ON SHEAR SPEED

Any interference of automating devices with tool changes is avoided on this Shear-Speed with a swing-out arrangement. The hinged mechanism swings the loader, index table and index slide completely clear of the machine. Pin-locked stops assure positive alignment.

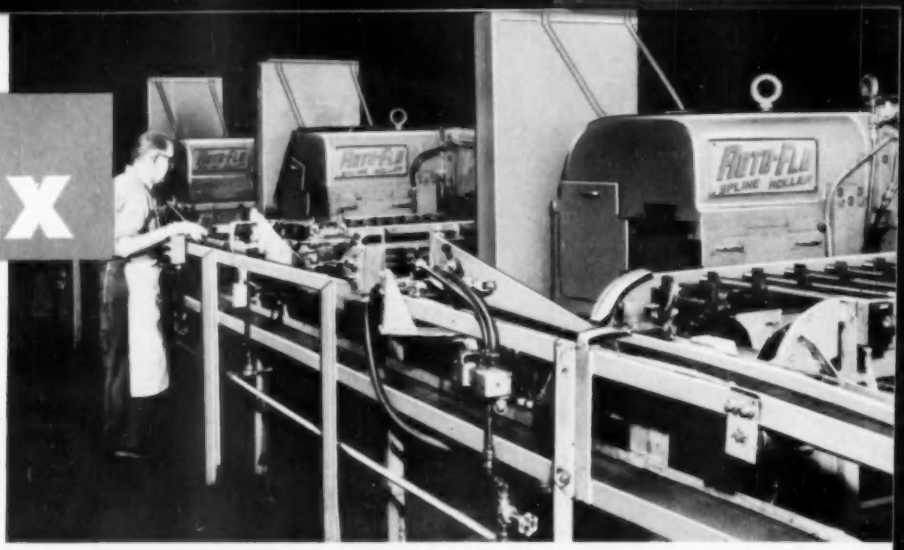


MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.
IN CANADA: COLONIAL TOOL CO., LTD.

This Month's

GEAR PIX



THESE 3 ROTO-FLOS WILL SPLINE 2½ MILLION AXLE SHAFTS IN 1957

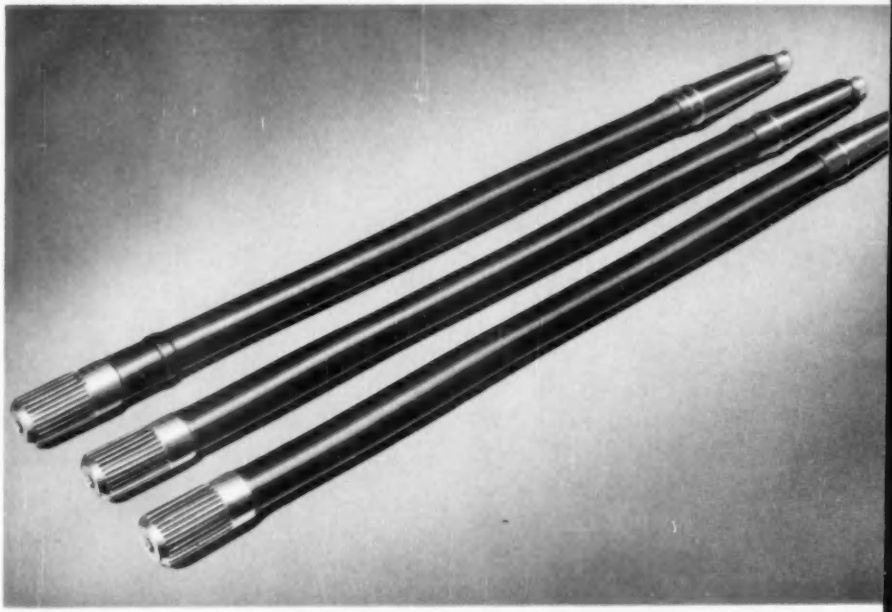
At a nominal tool cost, these 3 machines are producing all the splines on all the rear axle shafts for 5 lines of cars.

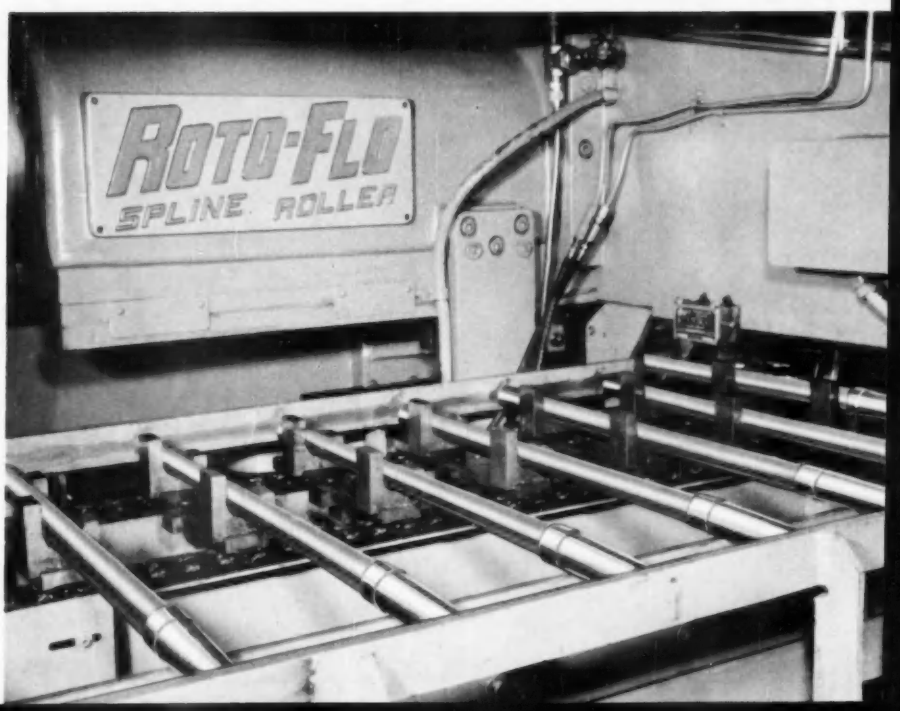
Here is the story:

No. of Roto-Flos	3
No. of operators	1
Output rate	1080/hr.
Surface finish	5 microinches RMS
Shafts per grind	123,000
Tool change time	20 minutes
Outside dia.	1.290 in.
No. of teeth	30
Spline length	1.62 in.
Diametral pitch	24/48
Pressure angle	30°

• • •

Roto-Flo is a development of Michigan Tool Company, the nation's gear production headquarters. The Roto-Flo process cold forms toothed and grooved parts—gives you a superior product in a matter of seconds instead of minutes. Roto-Flo machines will lower your capital investment, reduce direct labor costs, cut floor space needs, drop upkeep to the minimum, give you amazingly high tool life. For the story on Roto-Flo ask for "Chipless Production" (Bulletin RF-55). Write for your copy today.

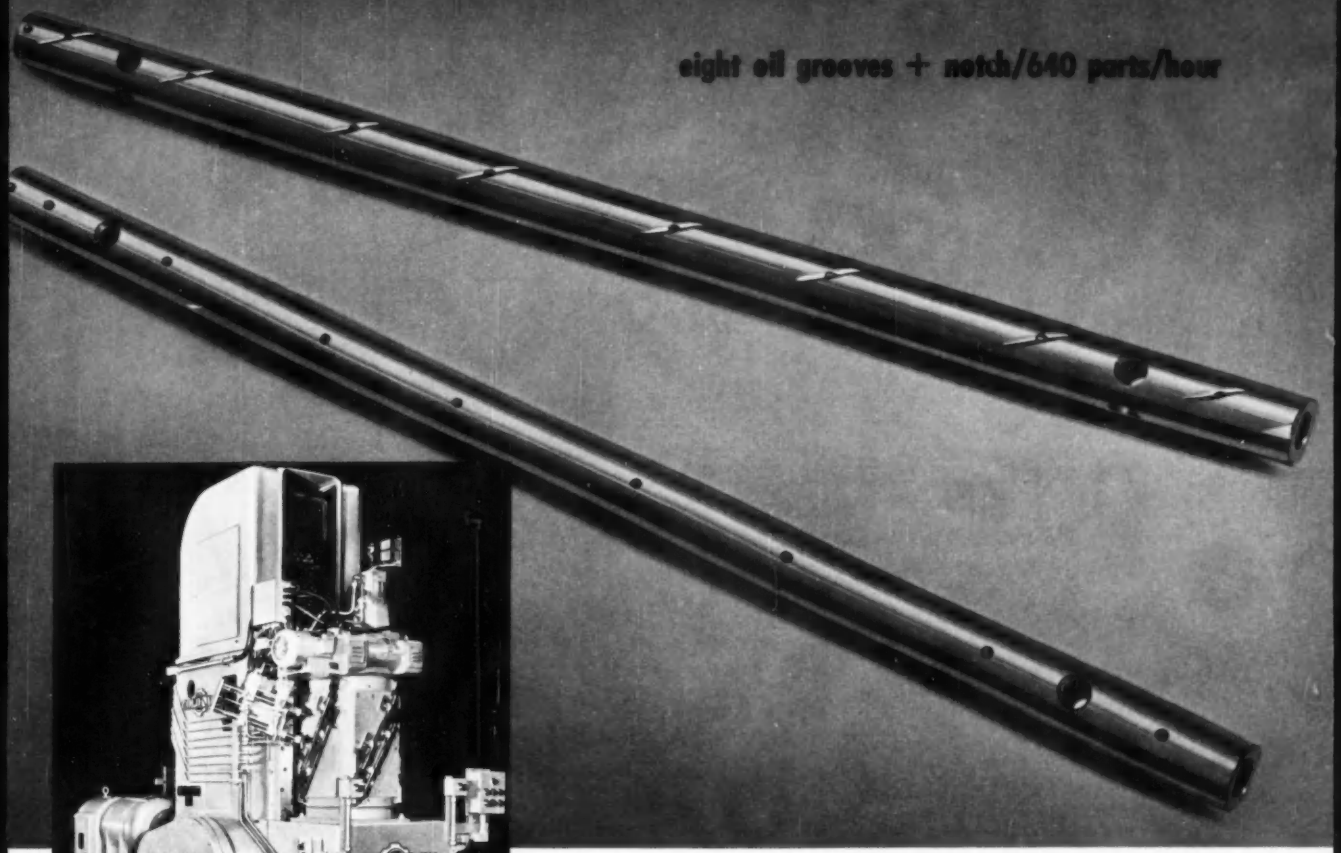




MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.
IN CANADA: COLONIAL TOOL CO., LTD.

WITH COLONIALS the final cost is less!



This vertical chain surface-broaching machine and a 4-station fixture were selected by **COLONIAL** *engineers for the UNIFIED BROACHING installation that cuts eight oil-groove slots and one identification notch in a rocker-arm shaft. Two parts are loaded, automatically probed for true position, broached, and automatically ejected in a cycle time of 9 seconds. Broaching is in one pass at 35 sfpm. The grooves are angularly cut at 30° to a radial depth of 0.06 inches. Parts unloading is by air ejection. The machine is a 10-ton, 160-in. stroke model. Profit-building applications like this are covered regularly in BROACHING NEWS. If you're not getting your copy, write today.*

"No Return" Broaching Does This on 1 Machine

COLONIAL'S one-way surface-broaching machine has an amazing output capacity. There is no time out for broach return. It has nearly twice the effective broach length (or stroke) as any other machine of the same height. Actually, the machine shown at the left has a 160-in. stroke although less than 12 feet high. Obviously, metal-removal capacity is practically doubled. For full details, write for Bulletin VCA.

COLONIAL
BROACH & MACHINE CO.
DETROIT 13, MICH.

WITH COLONIALS the final cost is less!



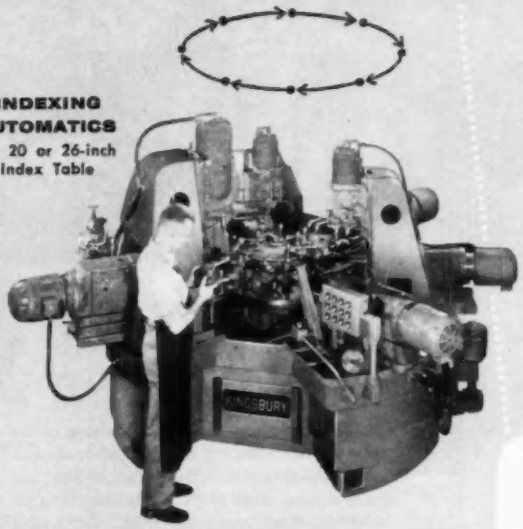
You Can Broach 8 Parts Like This in 1 Minute

Machining 8 thin-walled lugs on the face of a nozzle plate isn't the easiest of metalworking jobs. The part is complex; the production rate, high; the tolerances, close; and the quality must be distortion free. It is done by broaching 8 parts in 2 strokes in 2 indexing fixtures on one **COLONIAL** Dual-Ram. For jobs like these, broaching, and particularly broaching with **COLONIALS**, is the best answer. Let us prove it to you. Send us your prints and production requirements.

This is the **COLONIAL** *Dual-Ram 15-ton 66-inch stroke surface broaching machine that broaches the part. Automatic chip facilities handle the heavy metal removal (2.8 lbs. per min. of one machine cycle). Usually you can load while one ram cuts and the other is returning. You can use the two rams for different operations on the same part, or for broaching different parts. Dual-Rams are available in 6, 10, 15 and 25-ton capacities with strokes of 42, 48, 54, 66 and 90 inches. Write for Bulletin RT.*

COLONIAL
BROACH & MACHINE CO.
DETROIT 13, MICH.

INDEXING AUTOMATICS
12, 20 or 26-inch Index Table



For successive operations from one direction or several on most high production work. May have any number of units up to about ten, depending on the job. Usually 6 or 8 stations including one for the operator but others are available.



OPERATING UNITS

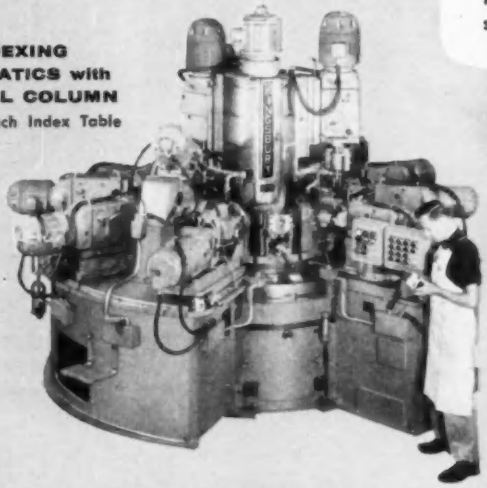
Compact, self-contained ½ to 5 hp drilling and tapping units. Individual speed and cam feed control. Use singly or in combination. Will operate at angles. Multi-spindle heads for parallel operations of similar size and depth. Drilling units drill, counterbore, countersink, ream, spot face, etc. Tapping units tap and thread.

KINGSBURY

HIGH PRODUCTION AUTOMATIC DRILLING and TAPPING MACHINES

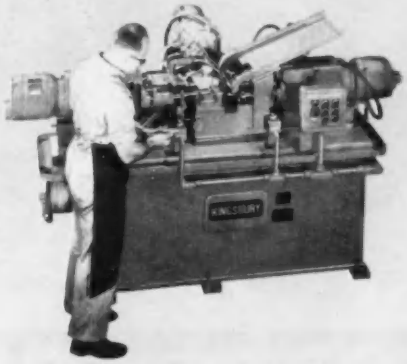
Each Kingsbury is a special machine, consisting of a standard base and a number of ½ to 5 hp operating units. It performs multiple operations to specifications on high production work. Units can drill, counterbore, countersink, ream, tap, mill light cuts, recess, spot face, thread, etc. Each Kingsbury is all tooled, ready to produce. We run test samples before shipment.

INDEXING AUTOMATICS with CENTRAL COLUMN
40 or 60-inch Index Table



For successive operations on larger parts — or parts requiring more operations — than regular indexing automatics can handle. Operating units on the central column make possible up to nine vertical operations, with easy access to tools. Usually 10 to 12 stations but others are available.

NON-INDEX AUTOMATICS
(Way Type)



For high production operations from two or more directions in the same chucking on many types of jobs. Usually have one work fixture, sometimes two, and up to eight operating units, mounted on a suitable base. For different operations on the same holes you need more than one non-index machine, but for certain jobs this may be the most practical method.

Write for specific bulletins. Or send us a print of your job and describe your operations and the production rate you need. Kingsbury Machine Tool Corporation, Keene, N.H.

KINGSBURY
AUTOMATIC DRILLING and TAPPING MACHINES
for low-cost high production

"Engineered Production" Service

FOR BROACHING



It takes all 3

American's "Engineered Production" Service . . . gives the broach-user the complete three-part service that is essential to obtain the most practical broaching method. Years of design and production engineering experience, unavailable at any price, are effectively added to your staff at no extra cost.

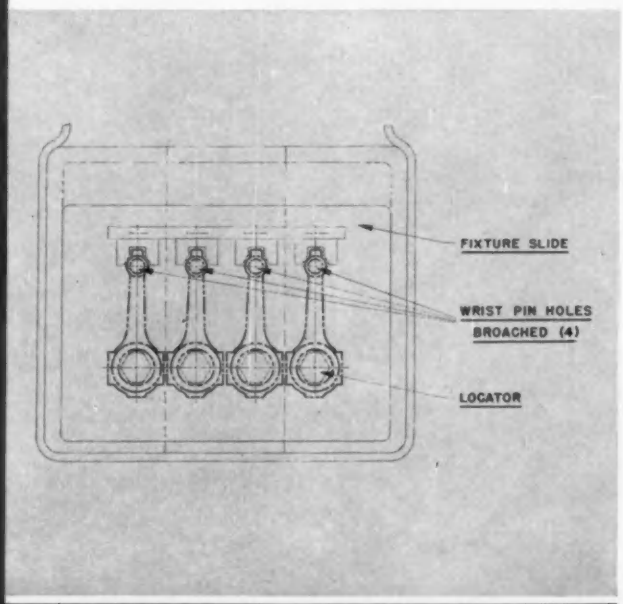
THE JOB—Broaching I.D. of wrist pin hole in connecting rods.

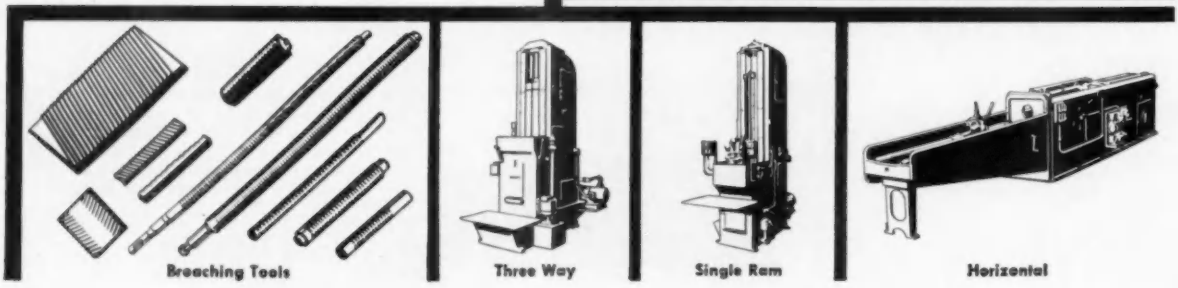
THE RESULT—Four pull broaches on an American Vertical Hydraulic broaching machine finish the holes at a production rate of 600 parts per hour.



1 PROPER BROACH TOOL DESIGN

Top-quality results on any broaching operation require starting the job with design of the broaching tool itself. In solving this all-important first step, American Broach considers stock removal, length and width of cut, finish tolerances required, etc. High-quality work and long tool life result because broach and machine are designed to operate as a team. Broaches are pulled through four at a time to finish the wrist pin holes at the required rate.





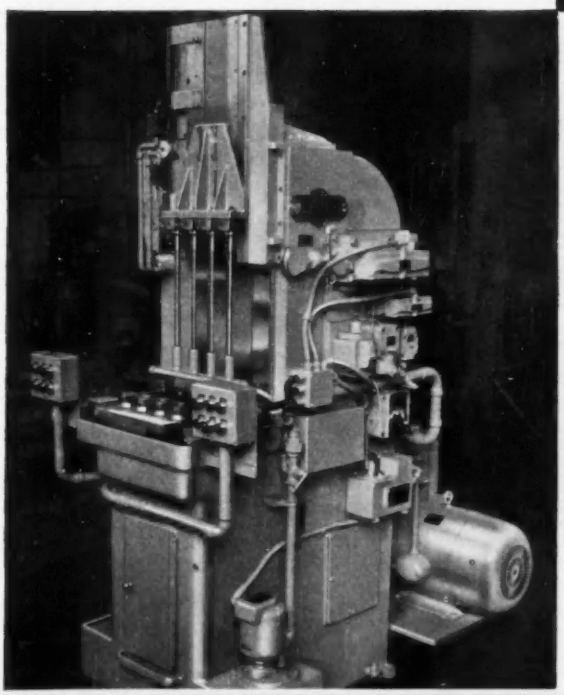
to give you peak broaching performance

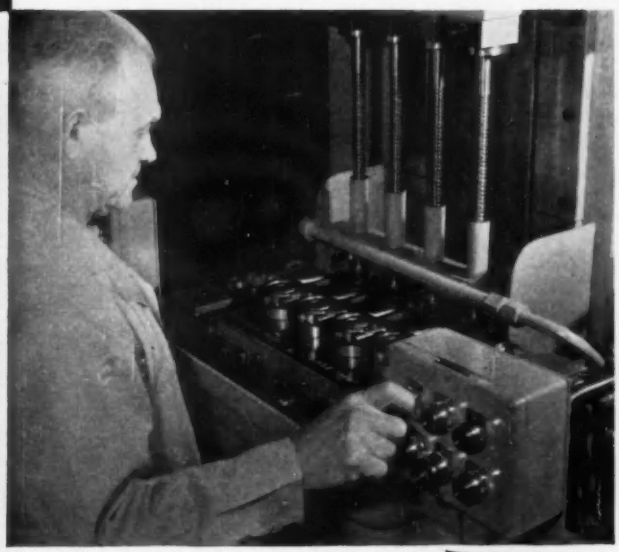
2 SPECIFYING THE RIGHT MACHINE

Production rate required, length and speed of stroke, relationship to other production machinery, available floor space, etc. determine the selection of the broaching machine capable of doing the best job. At American, machine selection follows design of the broaching tool. The four-station work transfer slide, electrically interlocked with the machine cycle, is provided with locating units and bushings for supporting work piece during the broaching stroke.

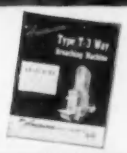
3 EFFICIENT FIXTURING

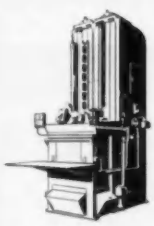
Whatever your parts geometry or hourly needs, fixturing by American Broach forms a vital third link in the production chain. In this setup, the operator loads four parts in fixture and pushes control button. The slide moves in for the broaching stroke and returns for unloading. Broaches are returned to start position during unloading. Thus, even with relatively inexperienced operators, production schedules are maintained since the "skills" are built into the tool, machine, and fixtures.



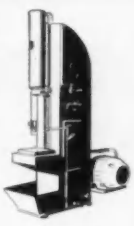


Get more facts in American Bulletin A218. Write for your free copy today.





Duplex Ram



Presses

SUNDSTRAND

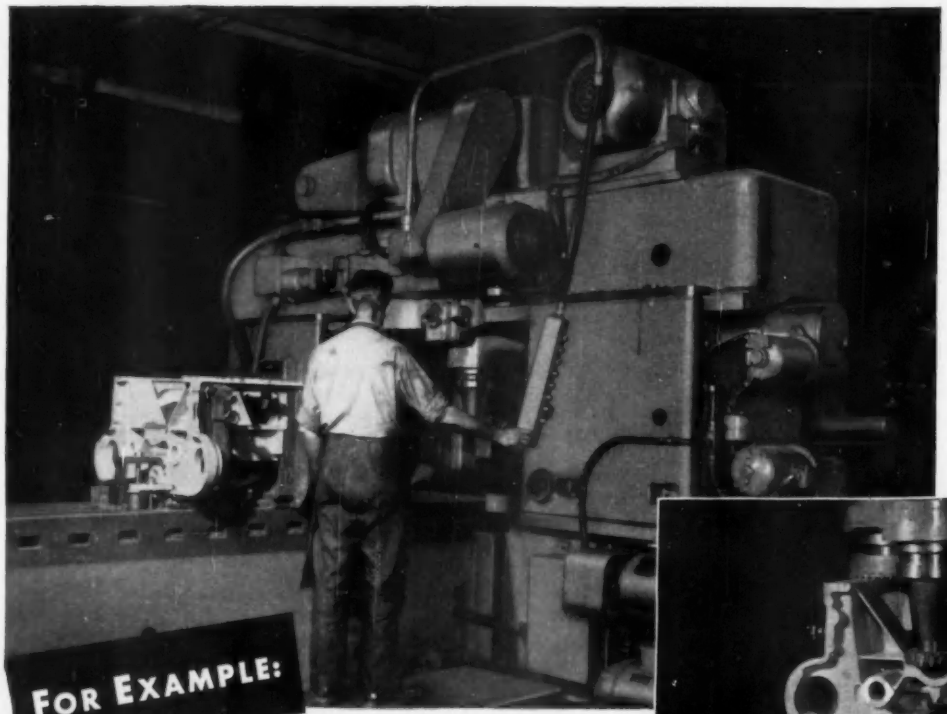
American

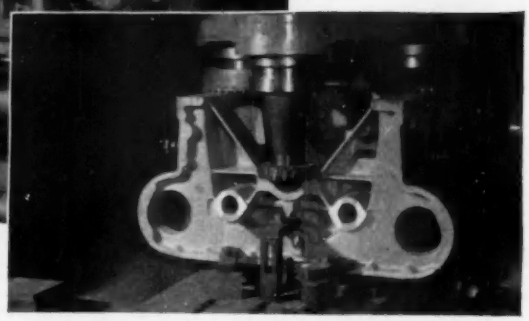
BROACH & MACHINE DIVISION

SUNDSTRAND MACHINE TOOL COMPANY

ROCKFORD, ILLINOIS

Before you buy any milling equipment see what you get from SUNDSTRAND!—





This Sundstrand Rigidmil has horizontal spindles for machining opposed faces and a three-spindle head on crossrail for machining different crankcase surfaces.

This Sundstrand Rigidmil Increased Production 25%

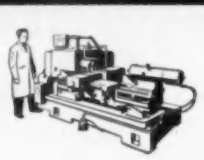
Faster cycling, pushbutton control, improved accuracy and finish due to precise, rigid construction, are major benefits being realized at LeRoi Division, Westinghouse Air Brake Company, Milwaukee, in machining castings for internal combustion engines and compressors on this Rigidmil. Scrap and rework are reduced because the complete processing cycle requires only the depressing of a single pushbutton on the pendant control. Additional versatility is provided by horizontal spindles on the columns that insure economical and accurate machining of parts with opposed faces.

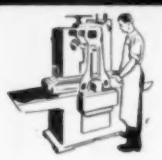
Sundstrand "Engineered Production" can improve production and quality on your job, too, by providing you with the machines and processing techniques required to handle your products most efficiently. Because Sundstrand builds a complete range of milling machines, as shown by a few examples on the facing page, you can be sure that you are getting the one best machine for your needs.

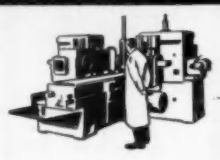
All the factors—economic as well as technical—are carefully analyzed by Sundstrand process and design engineers before a machine recommendation is made. Automotive, aircraft, farm implement, tractor, and railroad equipment plants are among those meeting exacting production standards on long-run or small-lot jobs with a big assist from Sundstrand "Engineered Production!"

SUNDSTRAND "Engineered Production" Service* *REG. U.S. PAT. OFF.

AUTOMATIC LATHES | SIMPLEX RIGIDMILS | DUPLEX RIGIDMILS

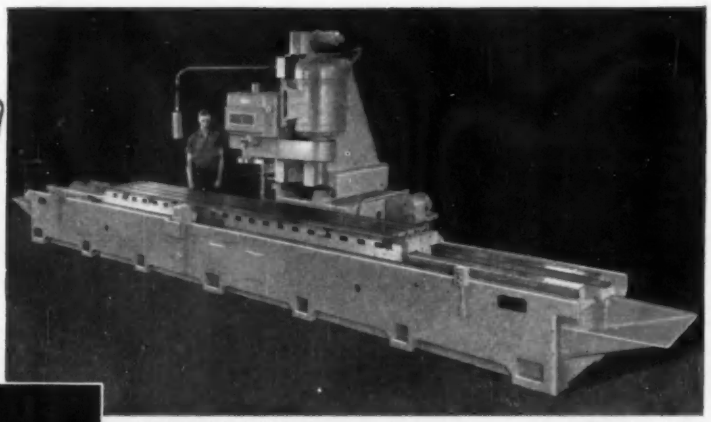




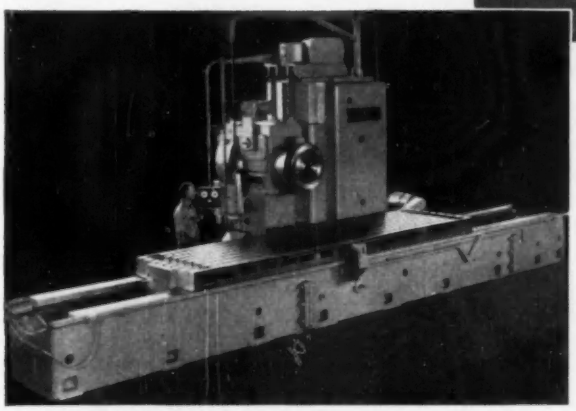




Shown here are a few of the standard machines that can solve your milling problems when applied with Sundstrand "Engineered Production."



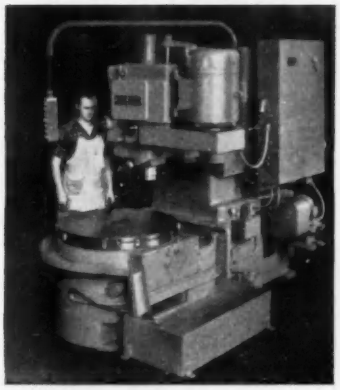
VERTICAL RIGIDMIL—Power vertical adjustment to spindle head, endwise quill adjustment, and cross adjustment to spindle head carrier are features contributing to easy adjustment and simple setup over a wide work range.



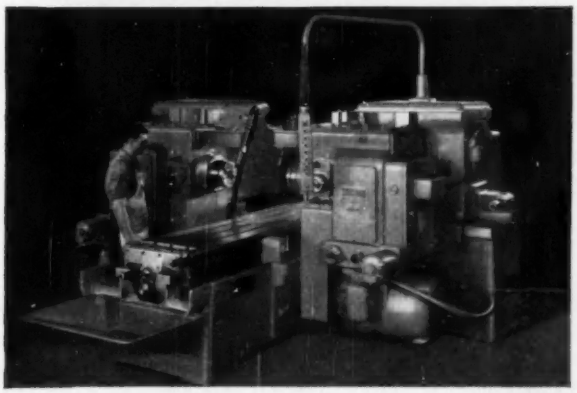
SIMPLEX RIGIDMILS—Table feed strokes ranging from 24" to 216" and spindle motors from 3 to 100 hp permit picking the ideal machine for widely varied materials and sizes of cutters.

DUPLEX RIGIDMILS—Fixed or adjustable column types enable opposed faces to be machined with maximum accuracy and economy. Adjustable column machines mount spindle heads on movable columns for cutting rigidity over wide work range.

ROTARY TABLE RIGIDMIL—Way-type cross adjustment of spindle head carrier and way-type vertical adjustment to spindle head provide maximum support to cutter for large or small parts.



UNIVERSAL RIGIDMIL—Recent addition to Rigidmil line, the universal bed-type machine, has both a horizontal spindle head and an all-angle, ram-type head making possible wide range of cuts at all angles.

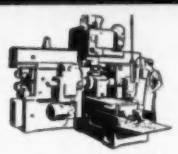


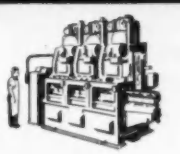


Additional Facts on how "Engineered Production" is applied to the complete line of Sundstrand Machine Tools is available in Bulletin 283. Write for your copy today.



TRIPLEX RIGIDMILS | SPECIAL MACHINES





SUNDSTRAND
Machine Tool Co.
2571 Eleventh St. • Rockford, Ill., U.S.A.

This Bulletin....

(yours for the asking)



shows how to get

added threading production

from your present automatics •

drill presses • turret or

hand lathes • threading machines

or other metal turning equipment

at only a fraction of the cost of specialized equipment

ACME-FETTE Self-Opening Thread Rolling Heads and Rolls *installed on your present metal turning equipment* will make that equipment more versatile . . . more productive. And you will maintain closer control over threading quality and deliveries.

Acme-Fette Heads roll all parallel thread forms, at speeds equal to turning speeds with high speed steel tools — up to 5 times faster than conventional thread cutting — on all types of horizontal or vertical machines equipped with either rotating or stationary spindles.

If the job calls for threading from the end, you can't beat an Acme-Fette for speed, accuracy, surface smoothness, versatility, or long life.

Send for Bulletin NAF-57 today, and you'll get a new concept of what thread rolling — the ACME-FETTE way — can do for you.

National Acme

THE NATIONAL ACME COMPANY, 173 E. 131ST ST., CLEVELAND 8, OHIO • Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.



REDESIGNED HEADSTOCK is massive, rigid casting, eliminating vibration and assuring maximum accuracy. Electric combination clutch and brake permits fast, smooth starts and stops without overheating. The Gisholt main control (manually or hydraulically operated) and the simple push buttons and feed-stop valves speed changeovers. A wide range of spindle speeds permits peak machining efficiency on all materials.

GISHOLT JETracer (mounted in place of standard front carriage) for either single or multiple pass work. For latter, JETracer will make up to four consecutive, automatic passes from four templates of different lengths and patterns. **Standard rear independent slide** can operate any time within the general machine cycle to complete the part. **Air- or hydraulically-operated tailstock** can be easily mounted, positioned or removed.

High capacity + flexibility = economy

ISN'T THIS WHAT YOU WANT

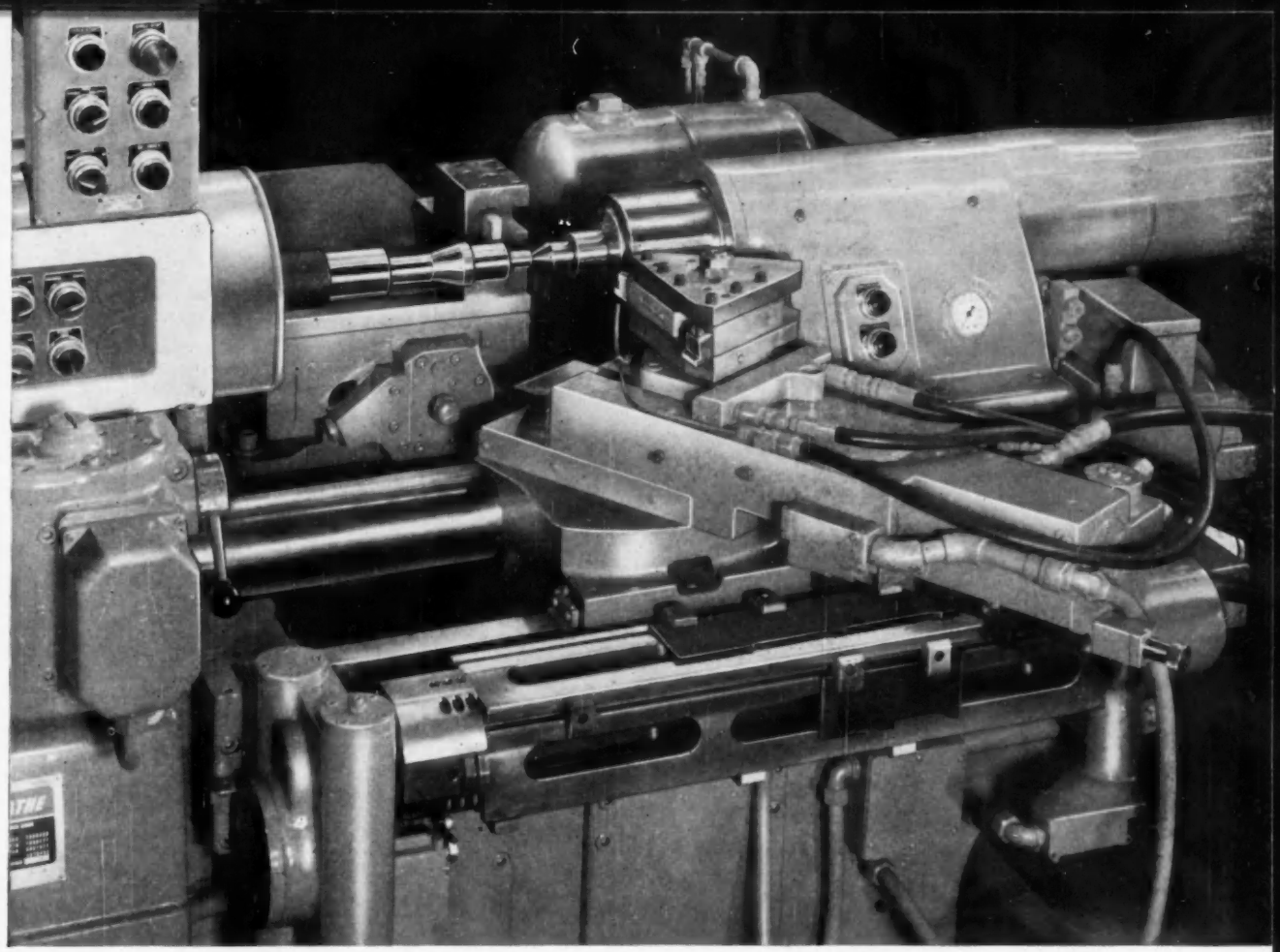
CONSIDER WHAT YOU CAN DO with this new Gisholt MASTERLINE No. 12 Automatic Production Lathe:

Here is an automatic lathe designed specifically for high production operations—yet this machine is flexible enough to handle a variety of similar parts in small repeat lots.

You can hold work in a chuck or fixture—with a work driver and tailstock—on an arbor or between centers. To start the automatic cycle, your operator simply loads the part, chucks it and raises the Main Control Lever. He is then free to handle additional machines—or to perform other work—until the part is completed.

On the Gisholt No. 12 Automatic, all carriage and slide movements are hydraulically actuated. The front carriage has both longitudinal and transverse motion—or a combination of the two—with quick approach, automatic tool relief and rapid return. You can mount the rear independent slide at any angle to machine bevel gears, drill cones, or handle other parts with angular surfaces.

For special jobs—like machining both ends simultaneously on small motor frames, cylinder sleeves,



IN AN AUTOMATIC LATHE?

or similar parts— you get even greater flexibility from the No. 12 through auxiliary slides, operated by movement of the standard slides. Or you can mount a back facing attachment within the spindle—for still another way to machine a maximum number of surfaces in one chucking. And for outstanding versatility with great savings in tool and setup costs, the front carriage on the No. 12 may be replaced by a single- or four-pass JETracer slide.

For complete details of the new features on the Gisholt MASTERLINE No. 12 Automatic Production Lathe, call your Gisholt Representative.



WRITE GISHOLT TODAY for advance data on the new Gisholt MASTERLINE No. 12 Automatic Production Lathe. Ask for Form 1178.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

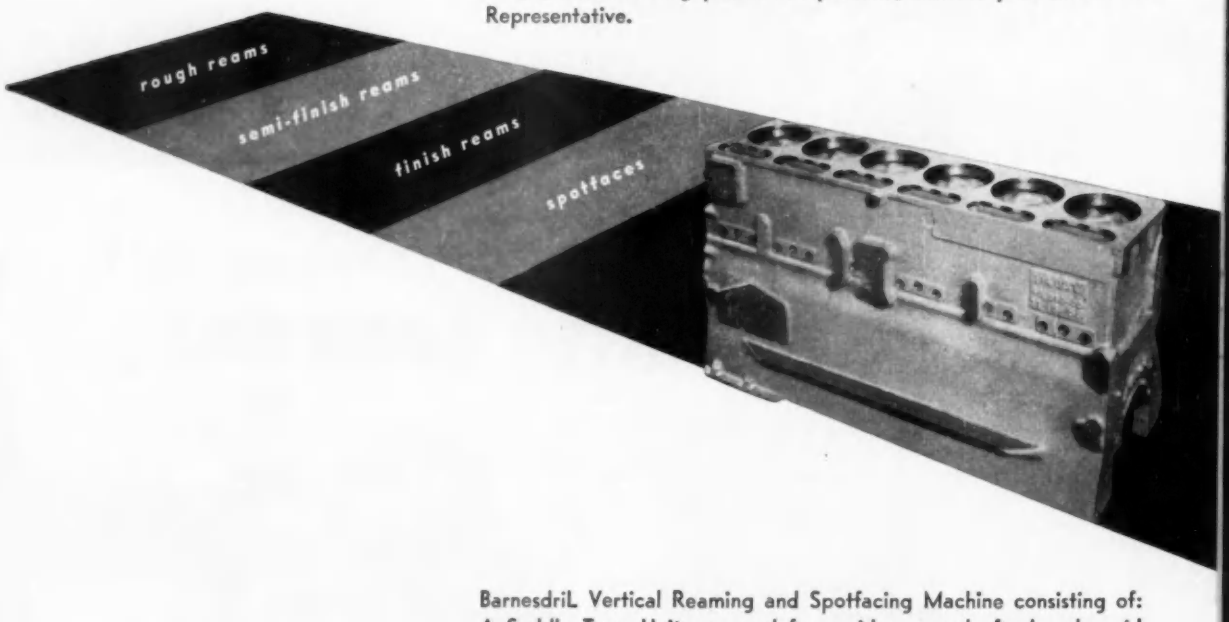
BARNESDRIL
combines 72 operations

This BarnesdriL Vertical Reaming and Spotfacing Machine rough reams, semi-finish reams, finish reams and spotfaces diesel engine blocks. It combines a total of 72 machining operations into a single machining cycle with six positions.

At the first position, 12 valve guide bores are rough reamed and 18 pads are spotfaced. The second position rough reams 6 injector bores. Third and fourth positions semi-finish ream the 12 valve guide bores and the 6 injection bores. At the final two positions both the valve guide and injector bores are finished reamed.

Previously, the machining of these blocks was performed by a Slip-Spindle-Type Machine with a two position fixture. The 12 valve bores were machined in one position and the 6 injector bores in the other. Alternate passes were made for rough, semi-finish and finish reaming with tool changes being made after each pass. Spotfacing was performed on another machine.

Combining operations into a single machine to cut labor costs and to meet required production rates, is the business of BarnesdriL. If you have a hole finishing production problem, contact your BarnesdriL Representative.



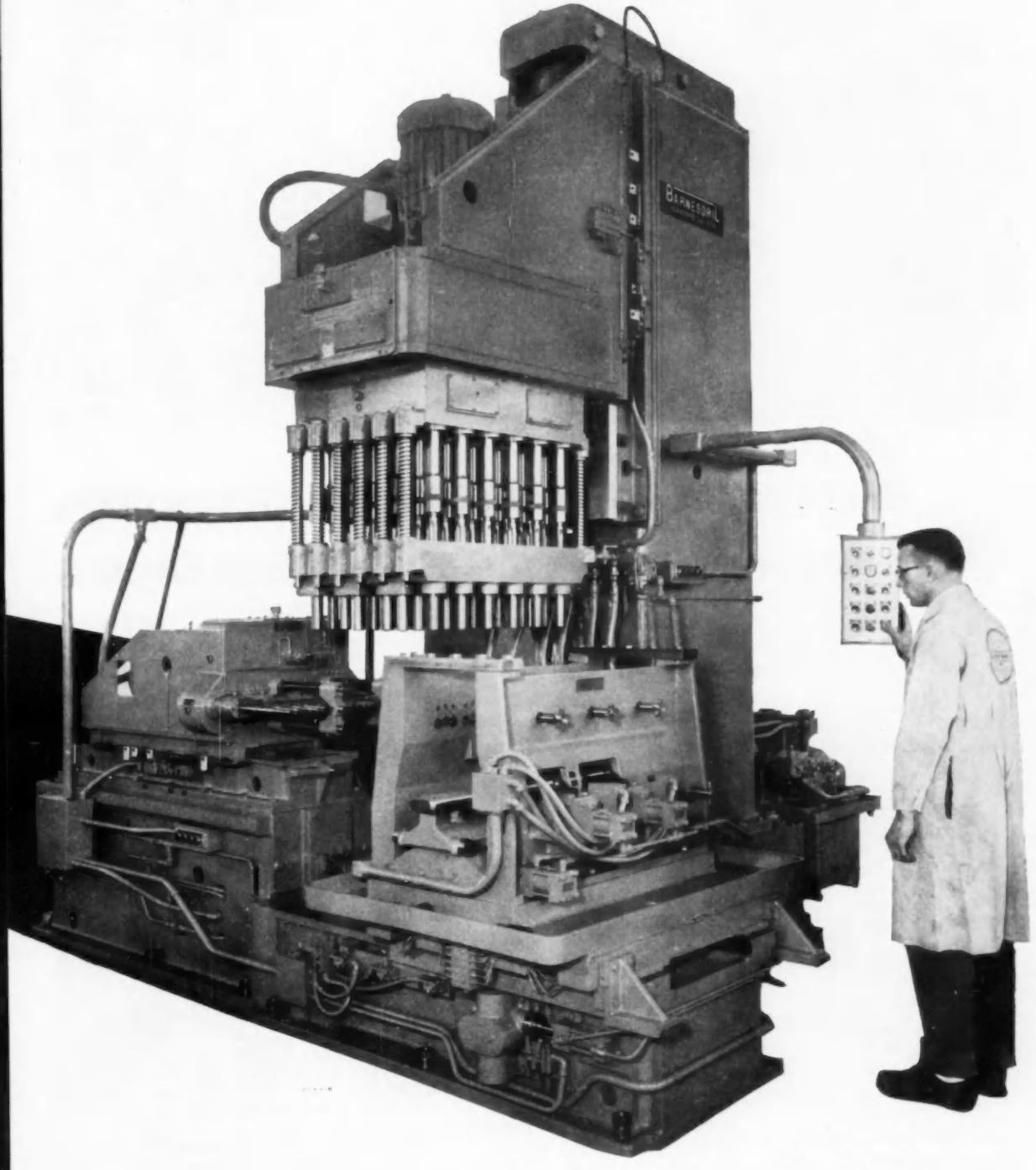
BarnesdriL Vertical Reaming and Spotfacing Machine consisting of: A Saddle Type Unit arranged for rapid approach, feed and rapid return on vertical column with a 54-spindle reaming head; a Saddle Type Unit arranged for rapid approach, feed and rapid return on a horizontal base section with an 18-spindle auxiliary head; a 6-position 10" index automatic hydraulic lateral index table; an automatic lubricating system and fixture.

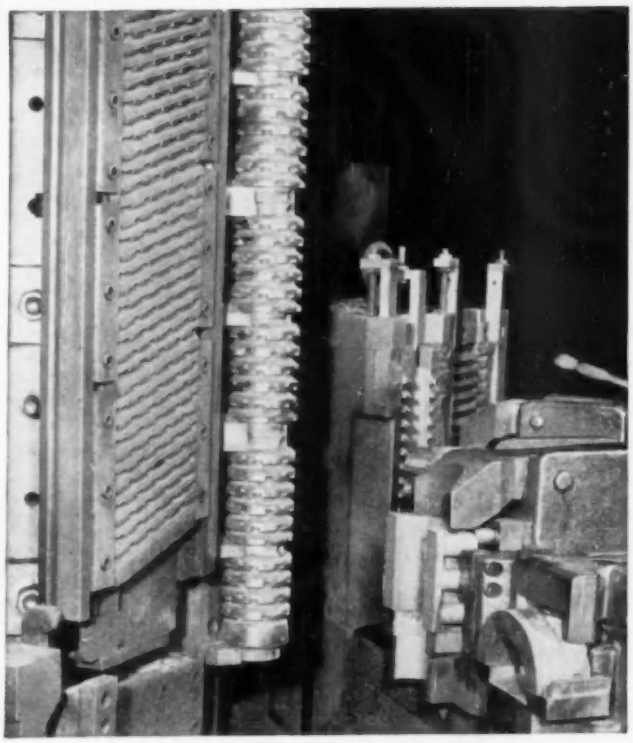
50th year

BARNES DRILL CO.

850 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE: 3419 South Telegraph Road

into a single machining cycle





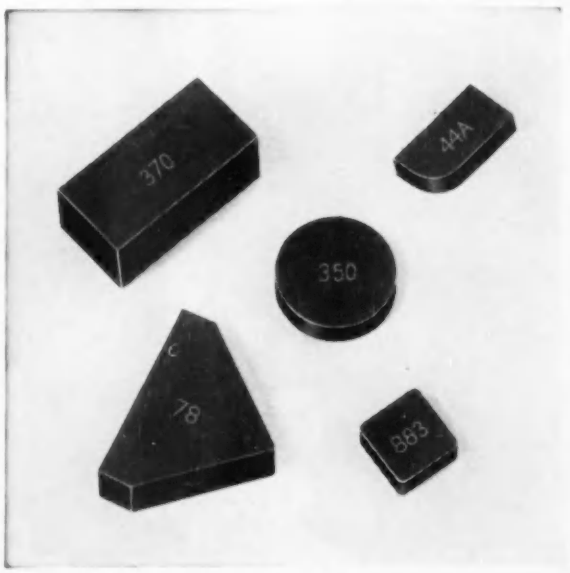
Grade 883 increases broach life 2500%

Highly abrasive cast iron used for this bearing cap at Studebaker caused conventional broaches to fail after maximum run of only 3,600 parts. After the switch to Grade 883, initial broach ran 50 days, produced 90,000 parts without service. Over-all machining costs were reduced 22%.

Grade 370 saves 155 hours' machining time

Normal machining time on this 165-ton cast-steel propeller runner at S. Morgan Smith Co. was 220 hours. Despite abrasive patches, and interrupted cuts, Grade 370 cut machining time to 65 hours – ⅓ the time. At 154 fpm, Grade 370 ran 30 hours without changing – compared to 6-8 hours with previous tools.

WHY MACHINE OUTPUT GOES UP, WITH CARBOLOY® CARBIDES ON



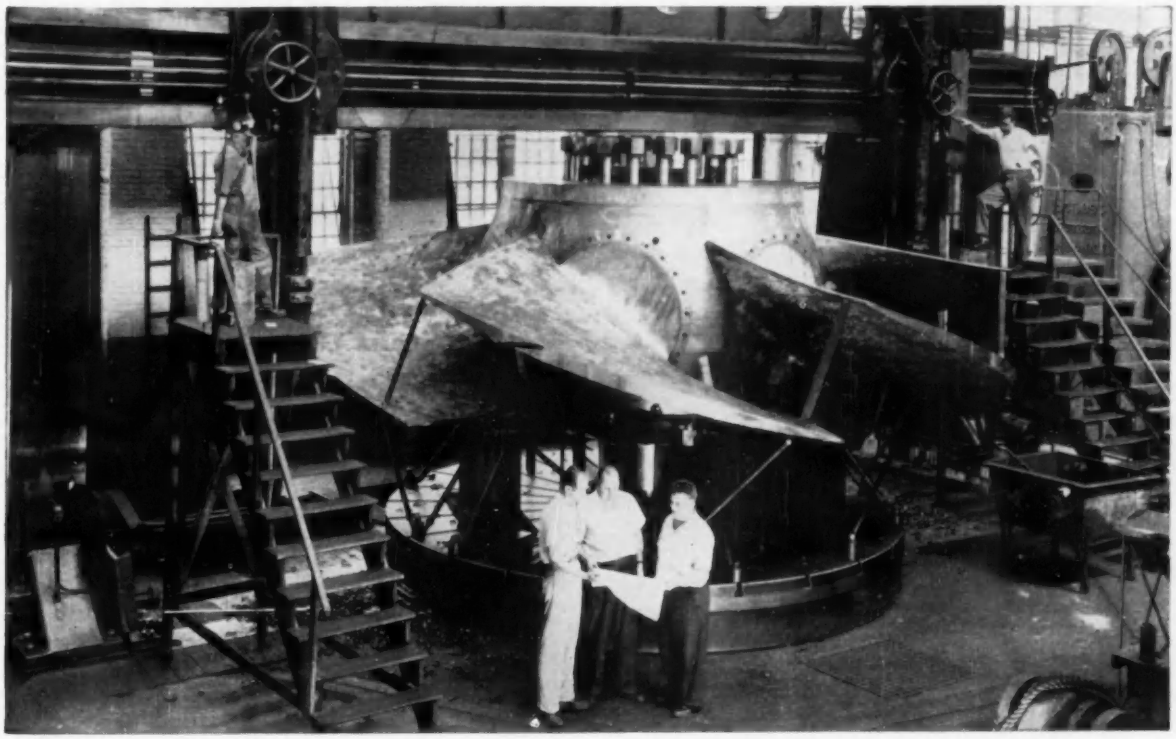


Grades for cutting every material

Eleven grades to choose from: 300 Series and 78 Series carbides for cutting steel; new Grade 860 for cast iron; five grades for nonferrous machining.

. . . in a form for handling every job

Standard tools in thirteen styles, hundreds of sizes; standard blanks in wide range of styles and sizes. Inserts for Carboloy toolholders or other standard types.



AND UNIT COST COMES DOWN, YOUR METALCUTTING JOBS

- Carboloy cemented carbides are tailored to the job
- Let you cut faster without sacrificing tool life

You'll increase the productivity of your machines, while you reduce total manufacturing cost per piece, when Carboloy cemented carbides go to work on your jobs.

Your machines will be more productive, because they can operate at greater speeds and feeds when tooled with the Carboloy grade designed for the job. And they'll produce more per shift, because Carboloy carbides take rugged machining conditions without sacrifice of tool life.

Your units costs will go down, because the use of these grades means less machining time per piece . . . with lower downtime expense, reduced grinding and maintenance charges.

Proved in the field

Hundreds of inplant case histories like the two shown above prove Carboloy cemented carbides can double and triple output, save thousands of dollars per year in machine time, manpower, and tool costs.

The reason is simple. Each Carboloy carbide grade has cutting characteristics tailored to a particular type of job. Whether you're machining ferrous or nonferrous metals, whether you're taking heavy or finishing cuts . . . one of the eleven Carboloy carbide grades handles the job. And you can quickly get the *grade* you need, in the *form* you need it.

Stocked locally by Carboloy Distributors

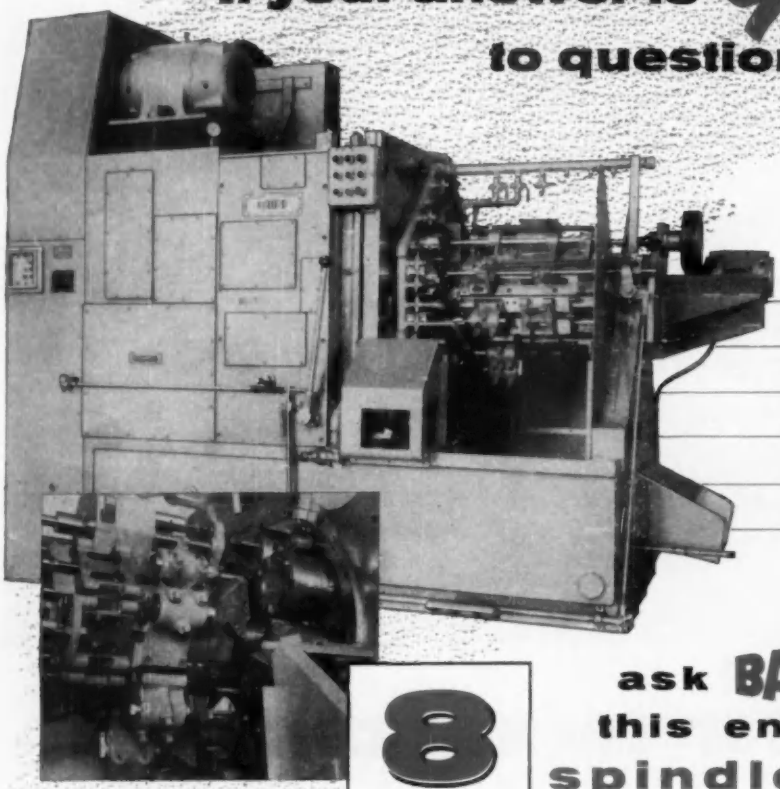
Your local Authorized Distributor of Carboloy cemented carbide products stocks standard tools, blanks, inserts, and toolholders in styles and sizes for every job or machine. He'll give you fast delivery, and expert technical assistance.

Call him today (you'll find his name in the Yellow Pages of your phone book). Or write: *Metallurgical Products Department of General Electric Company, 11151 E. 8 Mile Blvd., Detroit 32, Michigan.*

CARBOLOY®
CEMENTED CARBIDES

GENERAL ELECTRIC

if your answer is *yes* to questions like these:



Does your work call for . . .

HIGHEST PRODUCTION RATES?

MAINTAINED HIGH PRECISION?

EXCEPTIONAL TOOLING VERSATILITY?

PARTIAL OR COMPLETE AUTOMATION?

DEPENDABILITY FOR LONG RUNS?

LOW MACHINE AND TOOL MAINTENANCE?

Rear view of tooling area. Note installation of drilling spindles at top.

8 ask BAIRD about this entirely NEW spindle chucker

As every machine tool man knows, BAIRD Chuckers are the mainstay of the automotive piston production lines . . . and have for many years maintained this position of leadership in high speed, high precision and EXTREMELY DEPENDABLE production.

Now, out of this background of experience, Baird engineers are proud to present the NEW MODEL 78H 8-SPINDLE HIGH SPEED AUTOMATIC CHUCKING MACHINE.

This machine continues the well-proved basic features of previous Baird chuckers PLUS very much expanded capacity for operations and tooling. In addition to such advantages as controlled feeds and speeds for each spindle and independent strokes and feeds for each cross slide, the new universal two-stroke cross slides, with 3" max. stroke, are interchangeable among three positions covering six spindles. Individual longitudinal slides are arranged for one or two cutting strokes, and also for separate operation when used in tapping or drilling.

Heavy duty main drive includes provision for use of 50 h.p. motor and timing belt drive components. There is also provision for convenient power take-off as required for tooling attachments. All critical bearings are pressure lubricated with meter-controlled pressure lubrication to cross slides as well as tool slides. Power cranking is standard.

Model 78H is designed for installation of latest developments in special tooling and fully automatic control, with single or double indexing, automatic chucking, auto load and unload.

Clean and open design in work and tooling areas makes even complex set-ups less costly to install and much easier to maintain.

For manufacturers who can use its tremendous production potential, this important new machine represents an outstanding step forward in unit cost reduction. You are cordially invited to send us an outline of your production requirements for study and recommendations. Write Dept. AI.

ask BAIRD about it

THE BAIRD MACHINE COMPANY • STRATFORD, CONN.

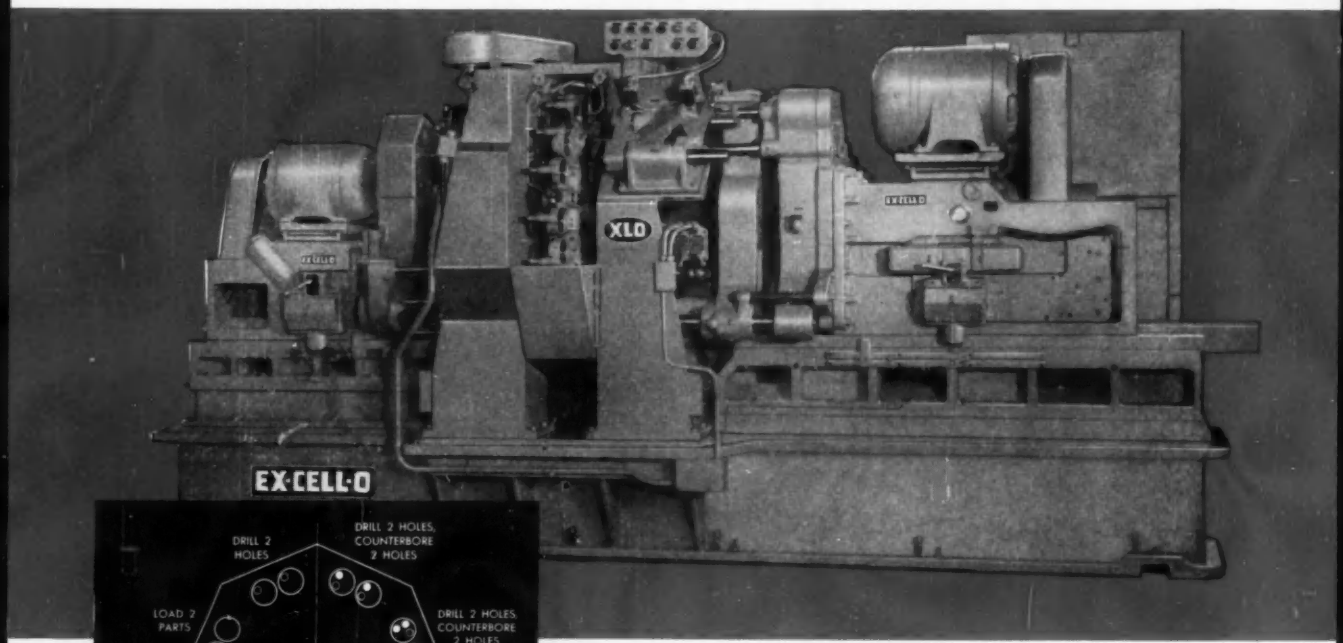
Ask Baird about these other major aids to high production at low cost.

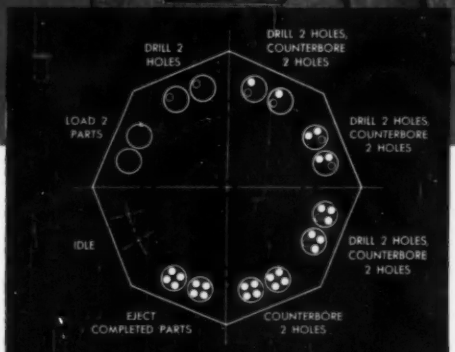
High Speed Automatic Multiple Transfer Presses • Automatic 12-Station Duplex Turning Machines • Vertical Continuous Lathes • Automatic Four-Slide Machines • Press-Formatic Flat Metal Forming Machines • Barrel Finishing Machinery • Specialized Machinery for Chain and Roller Chain Production, Garment Hook and Eye Production • Precision Bench Presses

IBA57

SPECIAL EX-CELL-O MACHINE

Drills and Counterbores 514 Rocket Nozzles per Hour





This diagram shows the progressive operations. At station 7, parts are automatically ejected.



Front and rear view of completed part. The rocket nozzle is tough forged steel; location of holes to each other and to the four pronged slots is critical.

Here's another Ex-Cell-O solution to a hard-to-handle machining job. Rocket nozzles are small, tough steel forgings. For the drilling and counterboring operations—shown in diagram—critical dimensions must be held.

Ex-Cell-O designed and built this special machine with a trunnion fixture that indexes through eight stations. Two Standard Ex-Cell-O Slide Type Hydraulic Power Units—one for drilling, the other for counterboring—actuate the multiple spindle heads. Features of the machine include simplified design, high productivity, safety and sturdiness. . . . When you're faced with a tough machining problem, call in Ex-Cell-O.

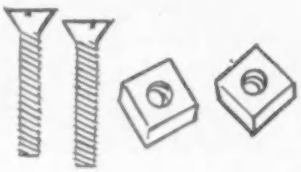
XLO
EX-CELL-O for PRECISION

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

58-28

If you assemble products with 2 or 20 fasteners  Thor Multiple nut setters and screwdrivers can save you money  and give you better quality. Write today for Thor's Multiple story—it's 

THOR POWER TOOL COMPANY

PRUDENTIAL PLAZA • CHICAGO 1, ILLINOIS

Send me, without charge, Thor's 24 page automation manual on multiple nut setting and screwdriving. I understand this manual answers all the questions about multiple operation in large or small assembly set-ups.



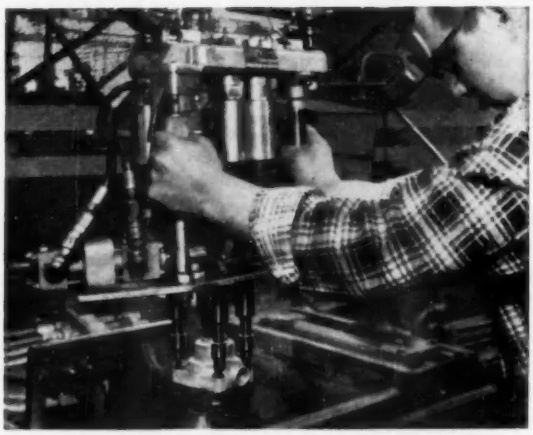
Name_____

Title_____

Company_____

Street_____

City_____ Zone____ State_____



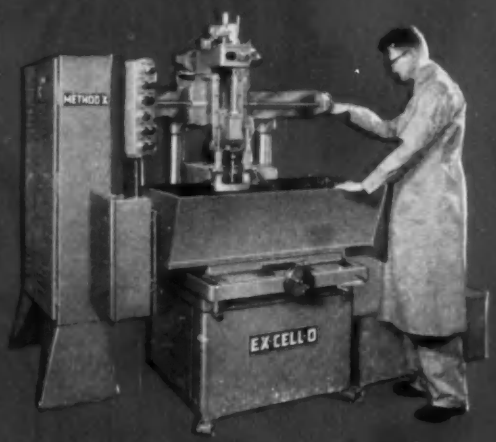
This Thor Multiple is setting 4 bolts at one time

Thor PORTABLE POWER TOOLS

Atlanta • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Denver • Detroit • Houston • Indianapolis • Kansas City, Mo. • Los Angeles • Milwaukee • Newark • Long Island City, N.Y. • Philadelphia • Pittsburgh • Richmond • St. Louis • San Francisco • Seattle • Toronto, Canada • Export Division, New York City



Cut intricate shapes of sintered carbides and super alloys with Method X.



Ex-Cell-O Method X Standard Vertical Electro-spark Machine.

Electrospark machining really cuts costs

XLO

EX-CELL-O FOR PRECISION

57-39

Doubt it? Here's what you can do. With an Ex-Cell-O Method X Machine, sintered carbides and super alloys can be quickly and easily cut off, pierced, slotted, formed, trepanned, drilled and tapped, often in shapes (above) no other machine tool can duplicate.

What's more, because Method X can readily machine toughest metals, many shops find it pays for itself as a scrap-saver alone. With Method X, other machines' mistakes can be corrected, even *after* hardening.

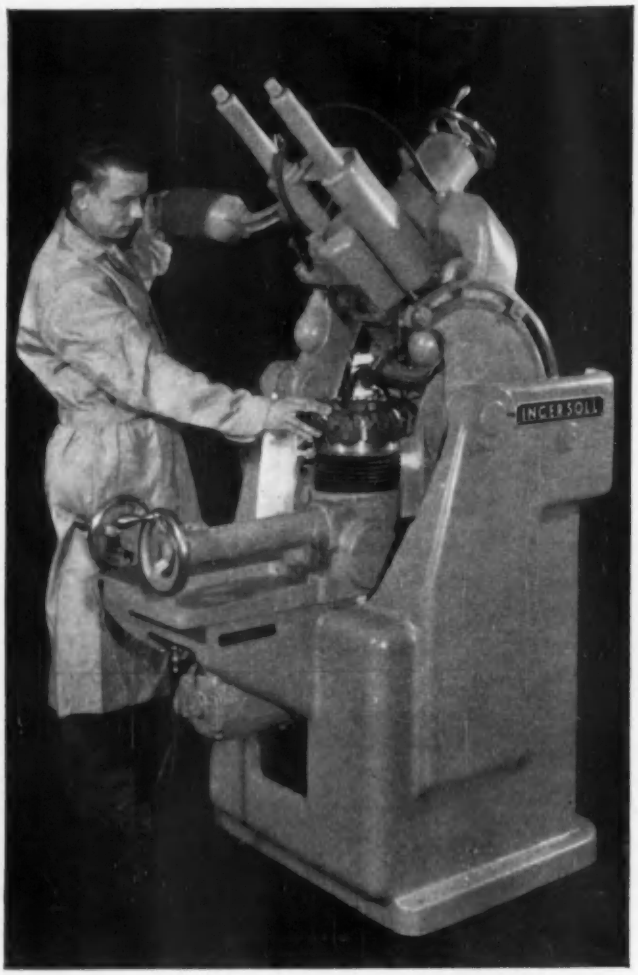
Why not check today on the very real cost-cutting opportunities Method X may offer in your own manufacturing operation? Simply contact Ex-Cell-O, Detroit.

EX-CELL-O CORPORATION — *Machinery Division*

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

want to check your cutter grinding costs?



The Ingersoll Cutter Grinder is Standard Equipment for Low Cost Sharpening of Inserted Blade Cutters.

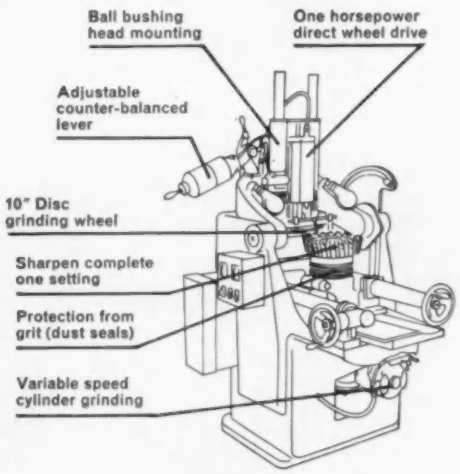
Let us resharpen one of your typical inserted blade cutters. This free demonstration, on a new Ingersoll Cutter Grinder, will tell you what you can expect to save, by replacing standard tool grinders or Ingersoll grinders of obsolete design with new Ingersoll machines.

Accurately ground cutters assure time and dollar savings, longer tool life, better tool and machine performance.

Write for shipping instructions—for a Grinding Cost Check-up.

Ingersoll Cutter Grinder—for a money saving investment of about $5,000.00 (with normal accessories)

4" to 30" Diameter Cutters. Accuracy is assured. Grinds both periphery and face in one setting. Simple and easy to operate. Faster than Universal Grinders. Grinds a constant clearance.



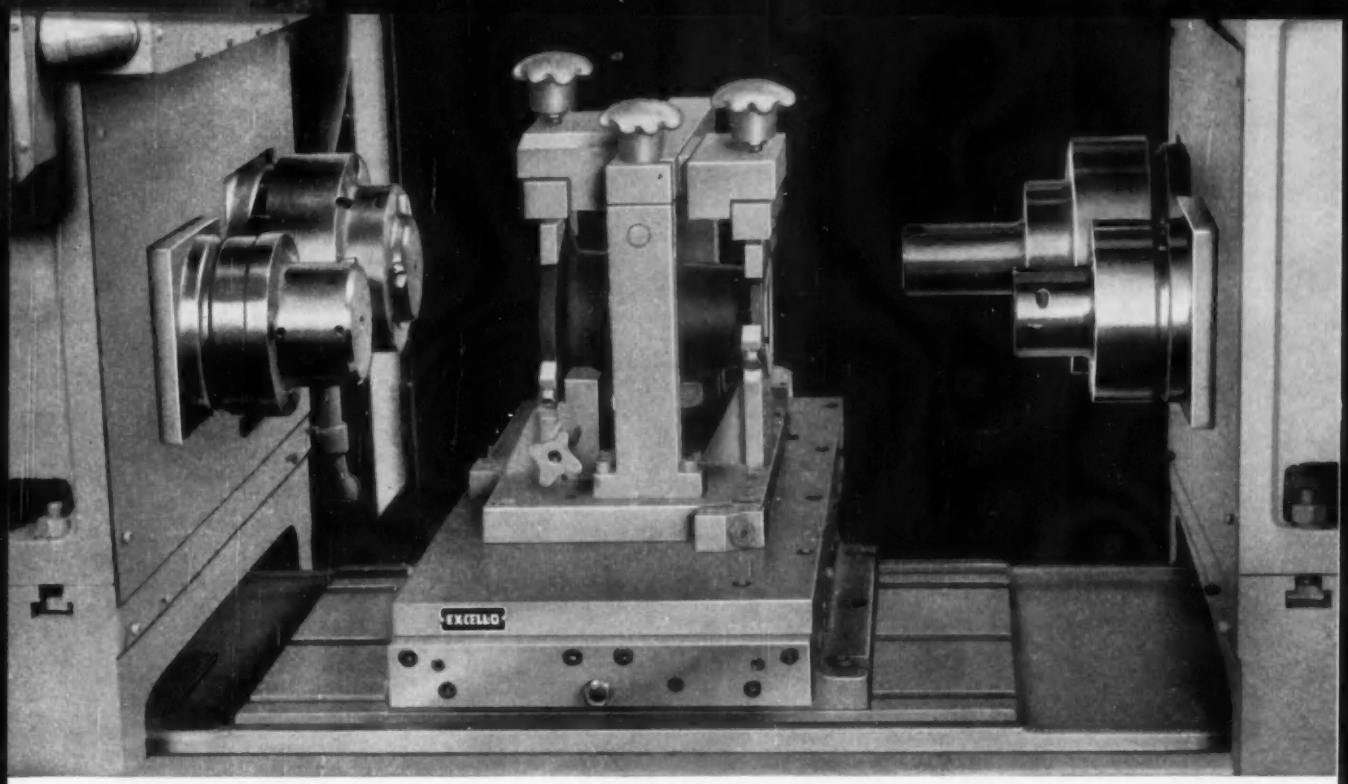


This 48-page book includes valuable grinding practice "do's and don'ts". Send for your copy today.

CUTTER DIVISION

THE INGERSOLL MILLING MACHINE COMPANY

ROCKFORD ILLINOIS



One of several fixture arrangements used for machining valve parts.

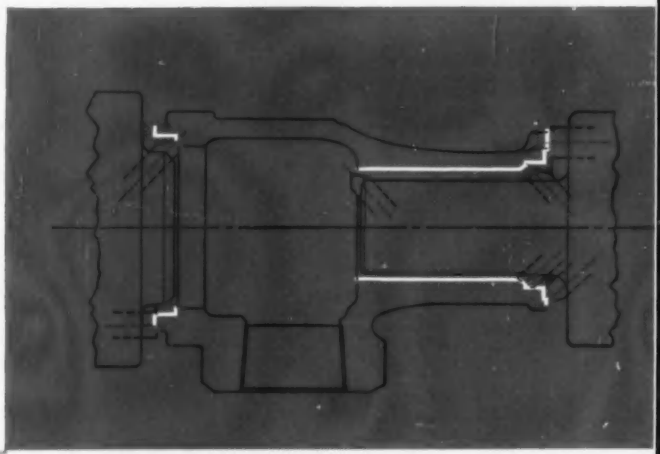
Fast and Flexible

SHORT RUN COST SAVER . . .

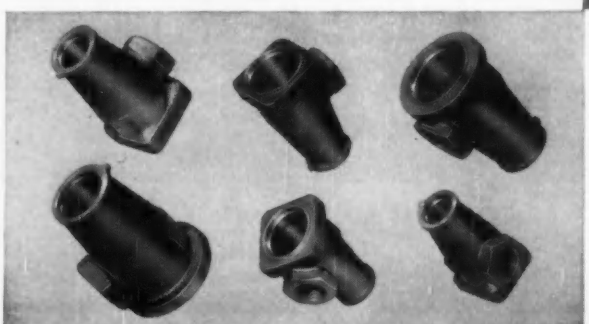
This Ex-Cell-O 17-A Precision Boring Machine rough bores, plunge faces, finish bores and chamfers a wide range of assorted cast-iron valve bodies and bases. Production schedules require relatively short runs of each size, so the tooling shown here has set blocks to accommodate the various parts.

Designed for medium and large size workpieces, the double-end 17-A Precision Boring Machine can handle identical operations at either end; rough at one end, finish at the other; or perform an entirely different operation at each end. So you can see the cost-saving versatility of this two-in-one machine.

Perhaps slow changeovers are inflating your production costs. If so, why not call your Ex-Cell-O Representative or contact Ex-Cell-O in Detroit.



White lines represent cuts made on a typical part.



Here are a few sizes of the valve bodies and bases processed on the Style 17-A Machine.

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN
Machinery Division

XLO EX-CELL-O FOR PRECISION

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

57-22


SIX
GREENLEE'S
ON THIS TEAM
GREENLEE
GREENLEE
GREENLEE
GREENLEE
GREENLEE
GREENLEE
Leading Auto Manufacturer Selects
6 Greenlee Transfer Machines For
V-8 Engine Block Precision Machining Line
The entire installation has 127 stations and a machined block comes off the line at each cycle. This first unit drills and reams locating holes, mills main bearings to width; mills lock slots, oil seal and slinger grooves, fuel pump and filter pads and rough bores cylinders. It also has a gauging station to check locating holes, a reject station and three turnover stations, the last of which positions the block for the next machine.
WRITE FOR
COMPLETE INFORMATION
GREENLEE
BROS. & CO.
1759 MASON AVENUE
ROCKFORD, ILLINOIS

AI

AUTOMOTIVE INDUSTRIES

Forming Equipment Section

BENDING

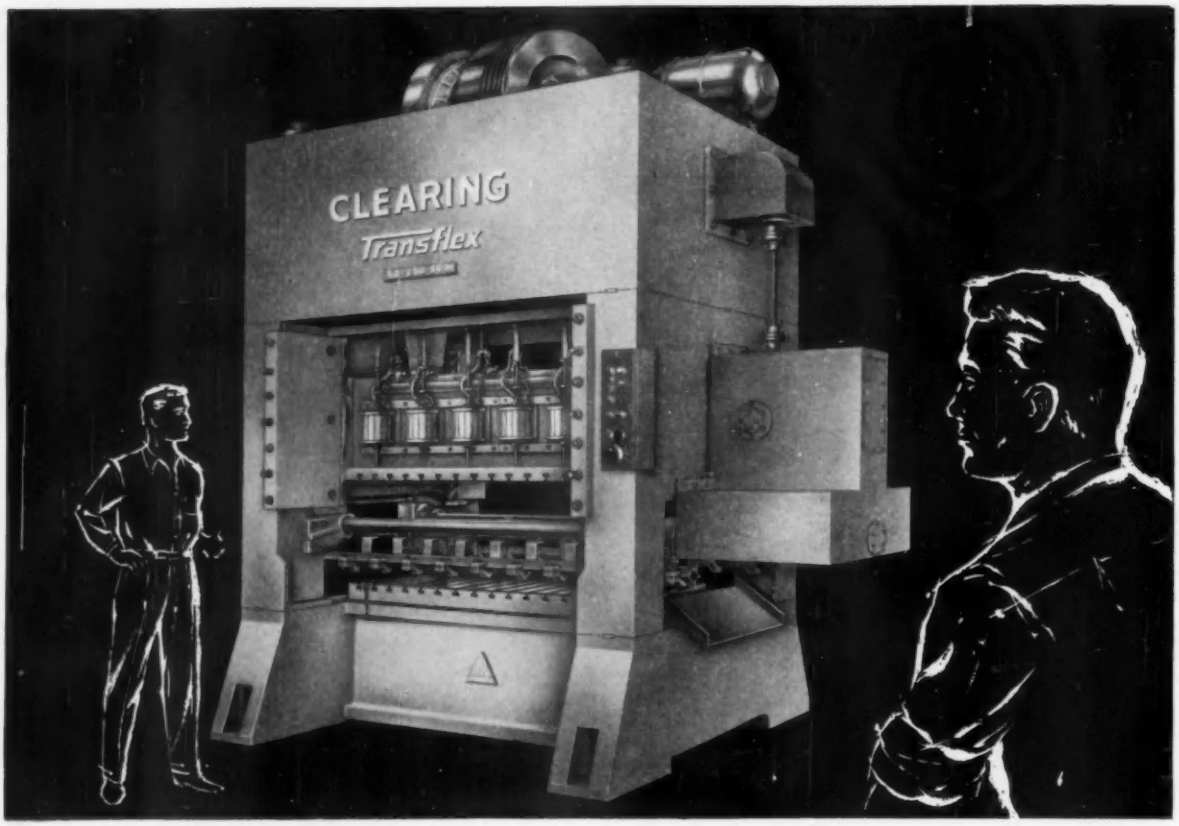
STAMPING

ROLLING

EXTRUDING

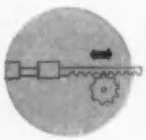
STRAIGHTENING

MACHINE TOOL AND PRODUCTION EQUIPMENT



Press automation for small parts at moderate cost?

Yes, with a Clearing Series-S Transflex Unit



Operating station center-distances are variable.

Feed fingers readily adjust for different sizes of parts.





Die cushions are adjustable right to left.

Knockout positions adjust right to left.



Transflex—transfer feeding plus the ability to produce a variety of parts—has now been applied to Clearing Series-S presses. These moderate priced straight side presses are produced in capacities from 75 through 300 tons.

These presses have all the major adjustment features typical of all Transflex units. In addition, provision is made for fast detachment of the finger bars so that die changes are quick and easy. Feed change-over—as required from part to part—is practically instantaneous.

As a result, it is now possible for manufacturers with requirements for a number of different medium size parts to automate production even when runs are not long. These presses bridge the gap between progressive die production and the conventionally large transfer presses. It is possible to have as many as sixteen die stations on a single press of this type.

A press like the one above can provide your plant with press automation *plus flexibility* of production at a cost that heretofore would have been considered impossible. We have a great deal of information on Transflex available. It's yours for the asking.

CLEARING PRESSES THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION *division of* **U. S. INDUSTRIES, INC.**

6499 W. 65th STREET • CHICAGO 38, ILLINOIS • HAMILTON PLANT • HAMILTON, OHIO

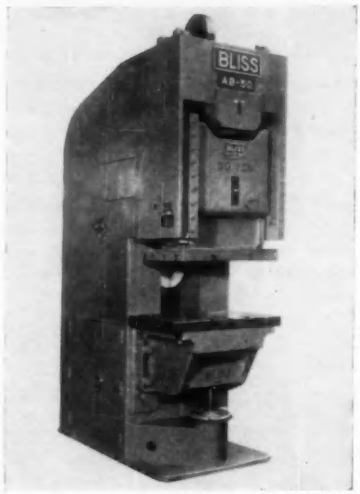
FORMING EQUIPMENT

FOR ADDITIONAL INFORMATION
please use reply card on PAGE 183

E. W. BLISS CO.

ADJUSTABLE BED PRESSES — A line of adjustable bed presses, featuring a fully enclosed box type frame, is offered by E. W. Bliss Co. The 50-ton press illustrated is the first size to have been built, but the complete line includes capacities ranging from 50 to 150 tons.

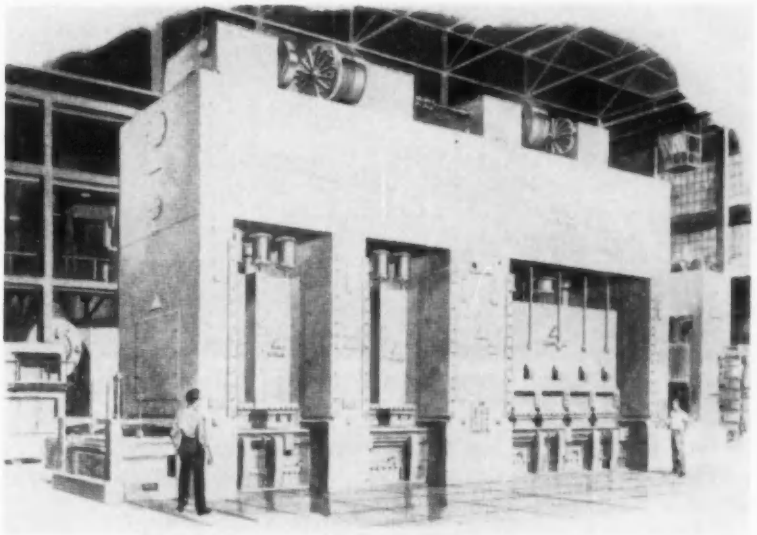
These are fully enclosed presses with a box-crown, box slide, and inbuilding of all controls. Air controls and the recirculating oil unit are enclosed on the left-hand side of the press; the press and motor controls are similarly flush-mounted on the right-hand side. Other features include a fast-acting air friction clutch and brake, an adjustable rotary limit switch, and bronze-bushed bearings at the frame, connections and gibs.



Bliss 50-ton adjustable bed press

The 18 by 24-in. bed of the 50-ton model illustrated can be raised or lowered a distance of 9 in. making possible a shut height adjustment from 11 to 20 in. and thus suiting it for a variety of unwieldy stamping and forming work. This model is 37 in. wide and 74 in. front to back.

Circle 80 on postcard for more data



CLEARING MACHINE CORP.

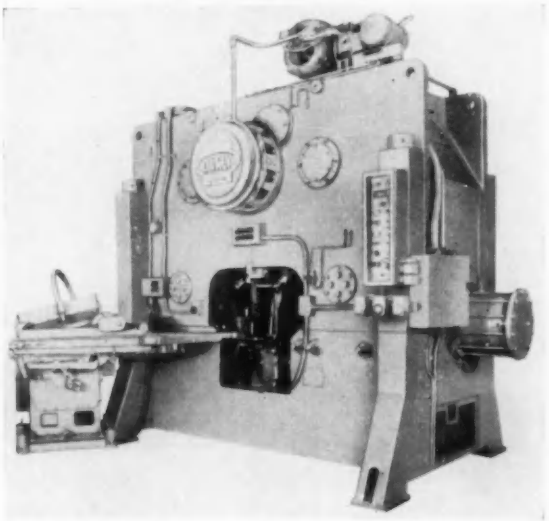
VERSATILE PRESS—Clearing Machine is using this new concept in press design as a means to alter the physical characteristics of the presses to provide for future changes in manufacturing requirements. The modular-type equipment may be used as separate presses or added to in order to make a three or four press integral line. Presses may be changed in any manner so as to alter the sequence of tonnage capacities and increase or decrease the number of available stations in an integrated line. This modular Transflex equipment is Clearing's idea of long range obsolescence insurance.

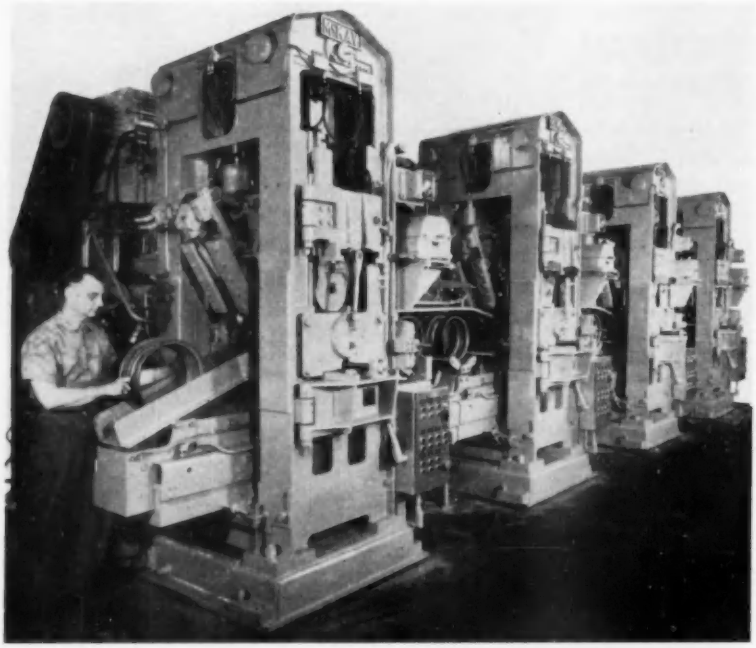
Circle 81 on postcard for more data

DANLY MACHINE SPECIALTIES, INC.

EXTRUDING MACHINE — This special 100-ton mechanical press is called a dual slide extruding machine. Two slides exert the horizontal pressures required to extrude 3¼-in. long piston pins for truck engines. Operation is completely automatic. The hopper at left feeds short lengths of bar stock to the mechanism for extruding to size, including inside diameter and length. The piston pins exit in the rear area. Net productive capacity per unit is about 2500 pieces hourly.

Circle 82 on postcard for more data





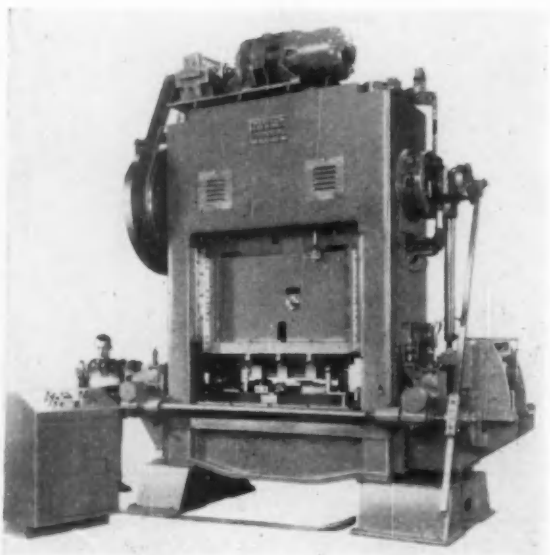
Newest type rim roller made by McKay Machine Co., is straight line, completely automated and will turn out up to 900 rims per hour.

THE McKAY MACHINE CO.

RIM ROLLING LINE—A new fully-automatic automobile rim rolling line can turn out up to 900 rims per hour. In operation the rims pass in a straight line from one roll stand to another on a conveyor. At each roll stand the lower roll and shaft move longitudinally by hydraulic pressure through the rim and then up upward to engage the top roll.

Wheels are generally made from 0.156 in. thick welded bands and rim diameters run from 12 to 16 in. and 9 in. maximum width. Rims are subsequently welded to the wheel centers.

Circle 83 on postcard for more data



Flexopress 200 - ton high-speed press operates at speeds up to 250 spm and incorporates a console type control.

NIAGARA MACHINE & TOOL CO.

ADJUSTABLE BED PRESSES — Modernized and redesigned, the latest version of a line of adjustable bed presses is now available. The new trim, compact design is said to incorporate a number of specialized controls and devices, neatly recessed in the sidewalls or completely housed behind flush panel doors, for increased output.

There are no overhanging or protruding components. Operator's panel, auxiliary power supply, flywheel brake operating lever, and safety



Niagara redesigned adjustable-bed press

block are recessed into the right side of the press. On the opposite side a panel door flush with the surface conceals the automatic oil lubricating system. Housed in the back of the press are the air control panel and combination motor - press control panel.

Circle 84 on postcard for more data

PRECISION WELDER & FLEXOPRESS CORP.

HIGH-SPEED 200-TON PRESS — A 200-ton high-speed Flexopress attains speeds up to 250 spm. Powered by a 25-hp variable speed motor, it features console control.

The slide, which is fitted with four preloaded ball bearing raceways, is said to contribute to a high degree of vertical accuracy. Bottom of ram is stated to be parallel to bed within 0.0005-in. Equipped with air friction type clutch and scrap cutter, the press has double feed rolls mounted integrally for accurate stock feed. It has an all-steel frame, welded and keyed with four tie rods.

Circle 85 on postcard for more data

WEAN EQUIPMENT CO.

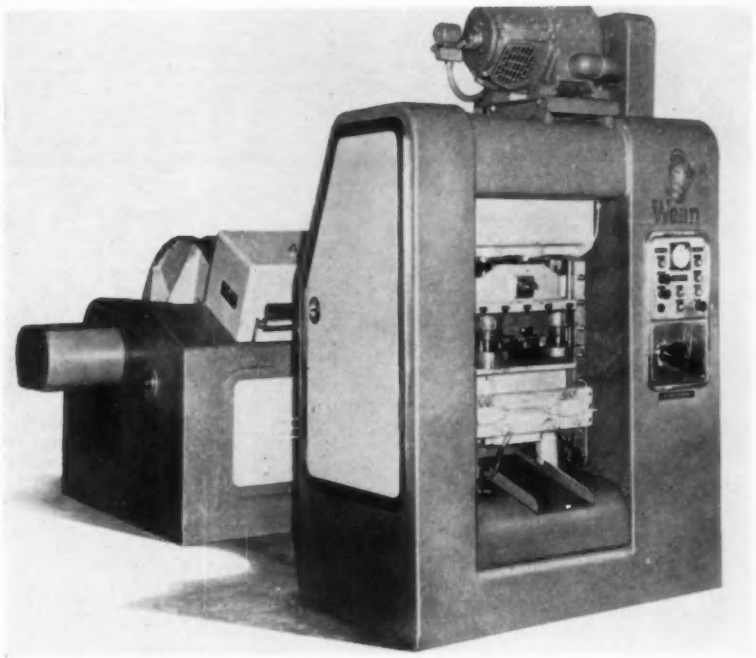
HIGH-SPEED "FLYING PRESS"—Utilizing a different principle of operation, a series of "Flying Press" ranges from 40 to 200 tons, with strokes of from 150 to 450 per minute max, handling coil widths of 14 to 48-in. It is understood, however, that the largest unit is 300 tons; also that one model can be run at 600 strokes per minute at feed lengths up to nine-inch, equal to 5400 ipm. Progressive dies can be used with this equipment.

The press has a movable upper and lower platen which synchronizes with the forward motion of the strip during the time in which the work is performed. A set of feed rolls is geared into the motion of the dies so that the stock is fed continuously, rather than on a start-stop basis, thus permitting higher strip speeds. The length of index is infinitely adjustable within the given range. A mechanism is incorporated for lowering the bottom die out of engagement with the upper in a controlled sequence of operation, thereby multiplying the effective feed range.

A decoiler has been developed especially for use with the press. The coil is supported on two narrow face cones incorporated in large diameter disks which act as side guides for the coil. These disks are supported on two rollers and are brought into contact with the coil by a handwheel. A lift is provided which can be raised or lowered by a motor-operated jack to center the coil on the cones. A leveler consisting of a set of entry pinch rolls and four work rolls is incorporated in the decoiler for removal of coil set. This leveler is driven by a motor and feeds the strip into a loop before the press.

The press control panel is arranged for manual or automatic operation. Manual operation is intended only for die setting and strip jogging operations preliminary to actual running of the machine. An indicator showing press strokes per minute is provided. A dancer roll system for control of loop between decoiler and press is also provided.

Circle 86 on postcard for more data



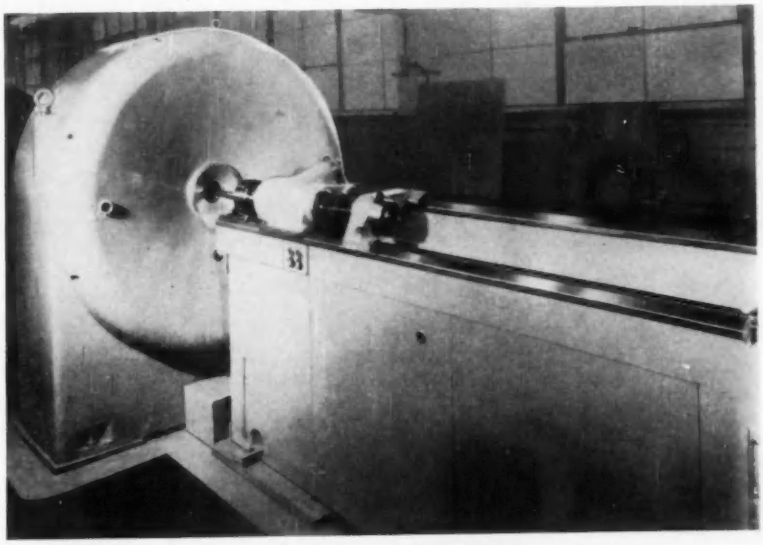
Wean "Flying Press" uses a new operating principle for increased production

---

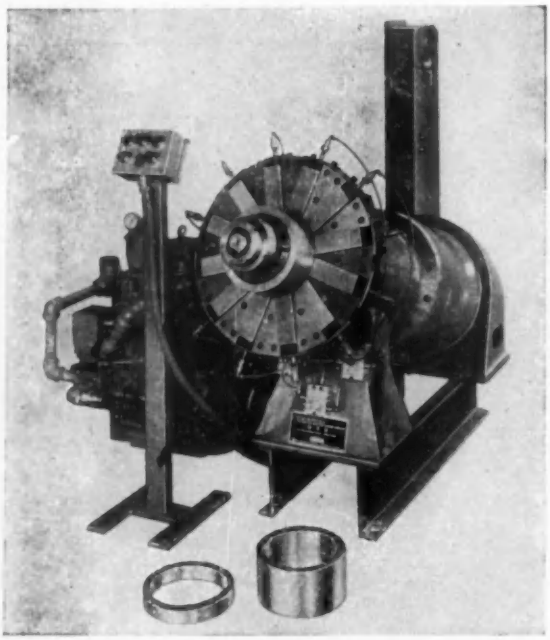
FELLOWS GEAR SHAPER CO.

COLD FORMING MACHINE — The No. 4 Fellows-Appel cold forming machine consists of a forging unit and feeding unit joined together. The work is fed into the forging unit where the forging dies are simultaneously forced onto the work in a direction radial to its center. The rate of feed is dependent upon the amount of deformation per stroke. The number of strokes, the feed and the rate of rotation of the work are changeable. The selection of these is determined by the type and the physical properties of the material being formed, its dimensions, the required deformation and the shape of the deforming section of the tool-set. Changes from one size of work to another can be easily and quickly accomplished.

Circle 87 on postcard for more data



Fellows-Appel cold forming machine



Grotnes 15-H-215 expander, the first of the company's "H" series, has a peak draw bar pull of 215 tons at 3000 psi hydraulic system pressure. Applications are forming and sizing of cylindrical, conical and polygonal parts which include tanks and jet engine components in both sheet metal and heavy ring categories.

GROTNES MACHINE WORKS, INC.

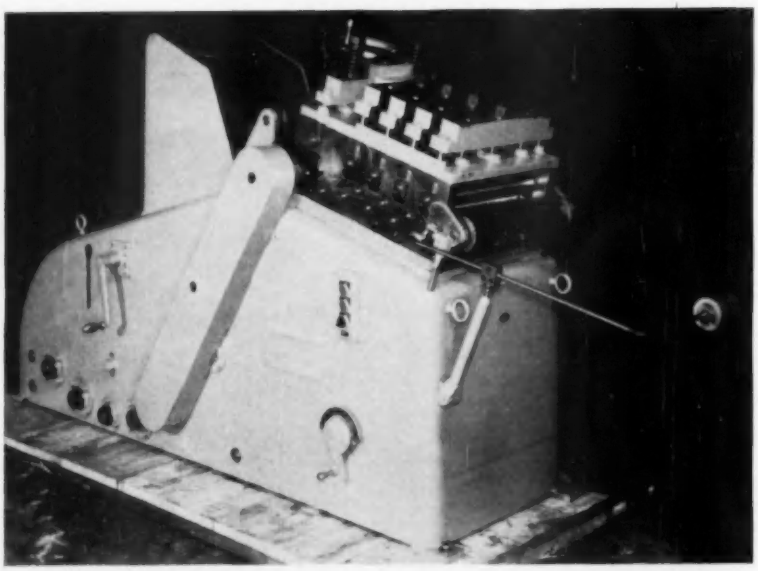
NEW SERIES OF EXPANDERS — The 15-H-215 expander, having a peak draw bar pull of 215 tons at the maximum hydraulic system pressure of 3000 psi, is the first of a new series with capacities from 60 to 1450 tons draw bar pull. The line incorporates added flexibility as to range of shapes and sizes of parts that can be handled in one basic machine by interchanging the draw bar, cone, jaws and table. The company states these expanders find their principal application in the forming and sizing of cylindrical, conical and polygonal sheet metal and tubular parts, such as tanks and particularly rocket, missile and jet engine components in both sheet metal and heavy ring categories. Accuracy up to 0.004-in. TIR can be obtained.

A duplex type variable delivery pump, reservoir, oil cooler, piping and valves comprise the hydraulic system, which is capable of operating the machine at from two to six complete cycles per minute. The unit shown has a speed of approximately two cycles per minute. Regardless of overall cycle time, the expanding rate can be varied by means of a pilot motor operated adjustment.

With the draw bar and cone arrangement shown in the photograph, 2½ sq in. of stainlese steel having a yield strength of 100,000 psi can be expanded. The test part shown is 1045 steel, having an ID of 8 in., a cross-sectional area of 4.55 sq in., and a yield strength of 60,000 psi. This part is shown placed directly on the jaws. Normally, tool steel dies are used between jaws and the part.

Circle 88 on postcard for more data

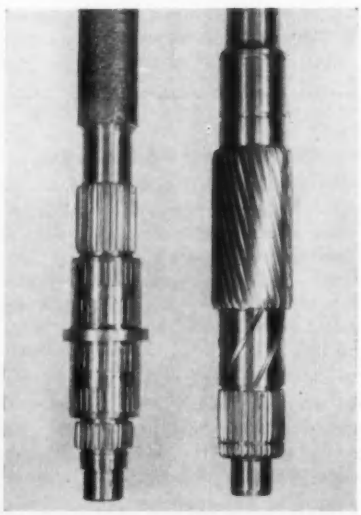
U. S. TOOL CO., INC.



COIL CRADLE AND STRAIGHTENER—The PDSC-1648 U.S. power-driven combination coil cradle and straightener is suitable for material up to widths of 16 in.; coils with OD up to 48 in. Cradle has four power-driven rest rolls, one idler rest roll, and one bumper roll. Straightener has eight straightening rolls, and two power-driven take-in rolls. The three-horsepower motor provides four speeds from 26 to 76 ipm.

Circle 89 on postcard for more data

MICHIGAN TOOL CO.



FORMED OIL GROOVES—Multiple oil grooves, either straight or helical, may be formed automatically on shaft bearing surfaces by the Roto-Flo process. The machine rolls the grooves into the shaft journal by means of toothed racks in a single pass. Oil grooves adjacent to splines on a shaft may be formed in the same pass as the splines.

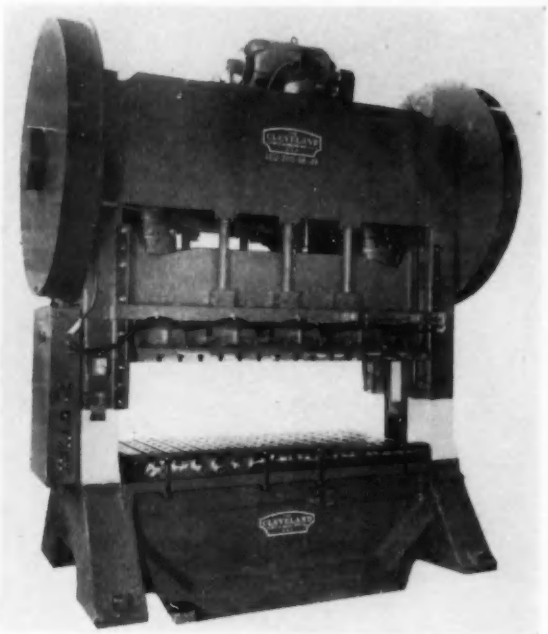
Circle 90 on postcard for more data

CLEVELAND PUNCH & SHEAR WORKS

DOUBLE-CRANK, STRAIGHT-SIDED PRESSES—Offering an almost unlimited number of combinations, a series of Cleveland double-crank, straight-sided presses is available in capacities of 75, 90, 110, 120, 150, 200, 250 and 350 tons, and with modifications of die space, stroke, slide adjustment, bed area, etc. The variety of sizes and capacities in which they are obtainable permits the handling of any thickness of material from light sheet metal to heavy steel plate.

The presses are built in single-geared, double-geared and flywheel types, and can be used in such operations as punching, forming, stamping, bending, cutting and light embossing—usually of large or irregular shapes. Twin drive is used exclusively on the larger sizes, and is recommended by the company wherever the work is particularly heavy.

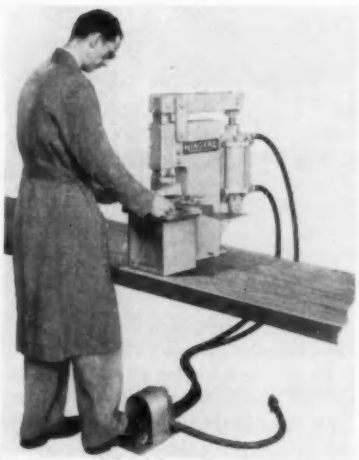
Circle 91 on postcard for more data



Cleveland 200-ton single-geared double-crank straight-sided press, one of a series, is equipped with twin drive and an electrically-controlled drum-type friction clutch with air brake. The flywheel has an auxiliary air brake to enable quick stops when power is suddenly shut off. This press has an 8-in. stroke, 10-in. adjustment of slide, shut-height of 30 in., slide or plunger face of 48 by 96 in., and a 33 by 81-in. bed opening.

NIAGARA MACHINE & TOOL CO.

NOTCHER AND PUNCH — With 6½-ton capacity and 4¾-in. throat, a new Niagara air power notching and punching machine can be equipped with a large selection of punches and dies for simple or intricate holes, corner trimming, or combination trimming and cut-off. A foot valve frees both hands for locating and feeding the material. The ram can be lowered gradually, to locate work at prick-punched points and to facilitate die changing. Throat permits notching and punching well inside edge of sheet.

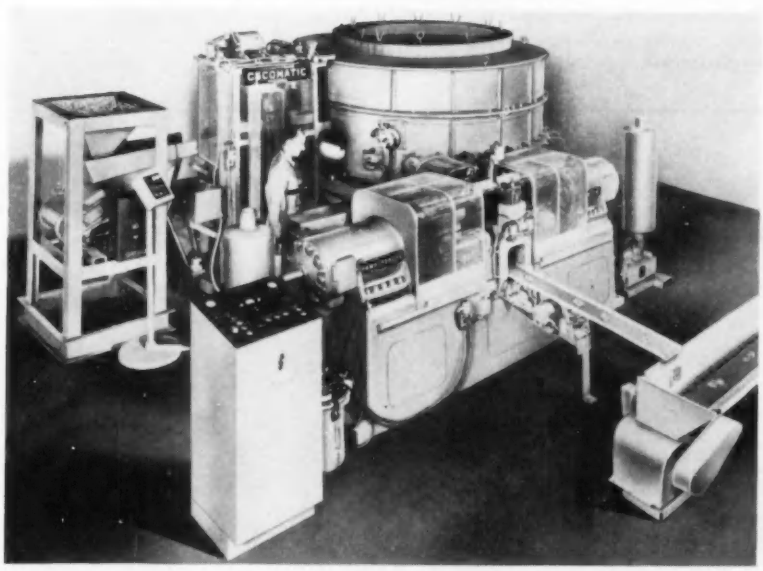


Niagara air power notcher and punch

A special duplex setup with two machines mounted on a single stand for edge or corner notching facilitates the fabrication of drums, pans and similar objects.

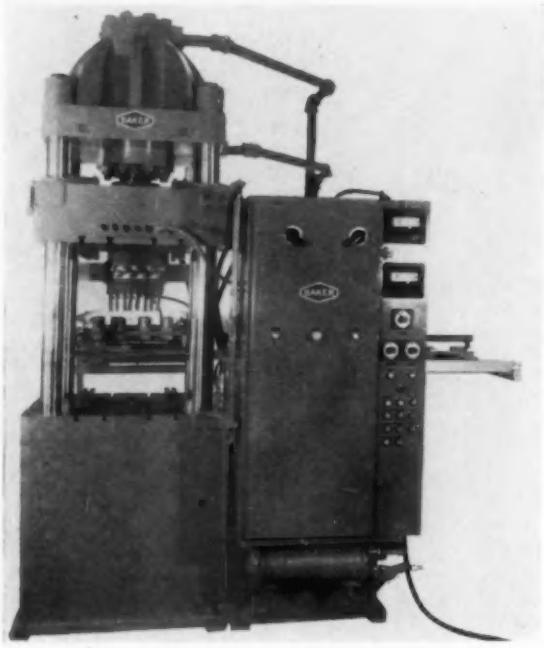
Circle 93 on postcard for more data

CHAMBERSBURG ENGINEERING CO.



AUTOMATIC FORGING—The shockless Impacter forges by means of horizontally opposed dies simultaneously striking the forging stock while positioned between the dies (either while dropping in mid-air, or while suspended from a moving conveyor or from a pallet). When incorporated with appropriate hoppers, furnaces and handling equipment and synchronized by electronic programming controls, it becomes a completely automatic process and is known as the Cecomatic forging process.

Circle 92 on postcard for more data



Baker Model 400-150 automatic plastic compression press has a stroke of 15-in. Daylight with fixed head is 30-in. The top-mounted hydraulic cylinder, which is a single casting for rigidity, has a working pressure of 3300 psi to deliver 150 tons. Pressure, however, can be controlled to range between 14 and 150 tons.

BAKER BROTHERS, INC.

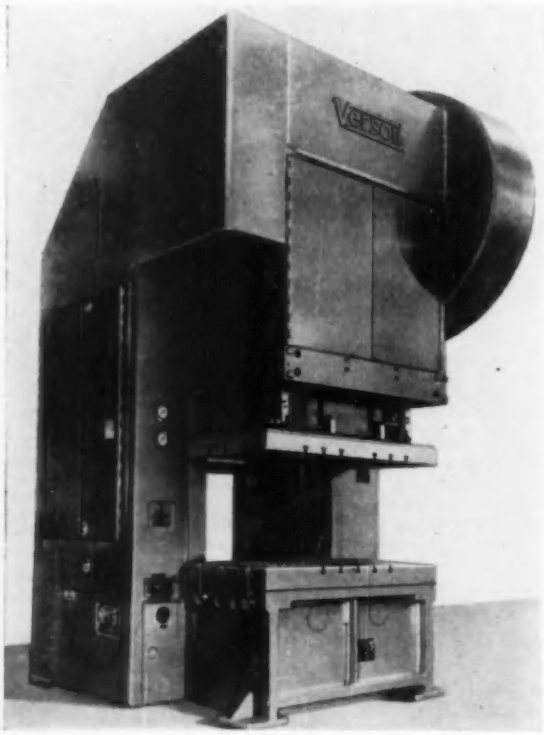
PLASTIC COMPRESSION PRESS—Designed to handle phenolics, ureas, alkyl, teflon, melamines, glaskyd and all thermosetting materials, a 150-ton plastic compression press, Model 400-150, is capable of automatic, as well as manual and semi-automatic, operation. It has a closure speed ranging from 6.1 to 355 ipm, with automatic deceleration possible at any point in the pressing stroke. Flexibility of control over any type of cycle is maintainable, it is claimed.

The electrical controls are included as original equipment and provide for all operations — automatic feeding, automatic ejection, automatic flash cleanout, de-gassing and deceleration. An innovation is the use of new Cypak units. An emergency button is also provided; when pressed, the press will return to top of stroke from any point in the cycle. Mold temperature control instruments are available if desired.

In semi-automatic operation, the press is operated by dual cycle buttons for operator safety. Standard equipment includes independent upper and lower hydraulic ejection. Automatic feeding is done by the universal loading board and automatic metering device.

The individual rows are movable backward or forward or can be eliminated entirely. The individual cups are movable right or left or can be eliminated. The measuring feeder is also universal, the tubes being on ball joints, permitting them to be directed in either direction, allowing several tubes to be shot into one extra large cup. They also can be shut off entirely.

Circle 94 on postcard for more data



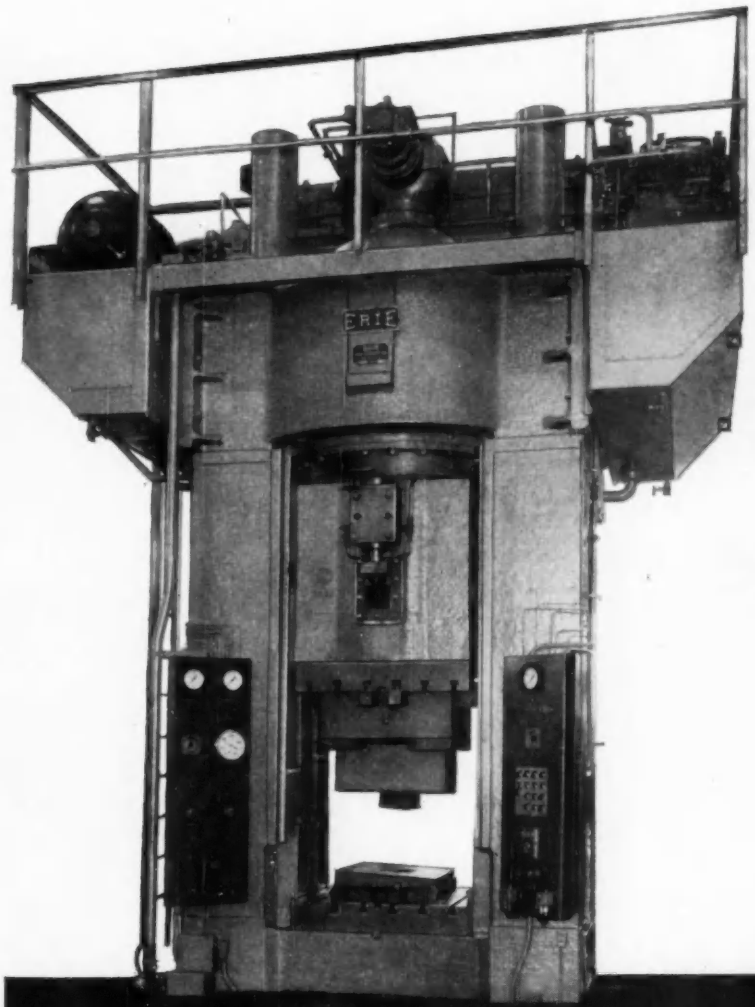
Verson gap press, of completely - enclosed streamlined design, contains a completely automatic lubrication system with all gears enclosed and running in oil. A central lifting hook on the press simplifies setting and moving the press. It is possible to have the press moved from position to position for convenient location set-ups on special work.

VERSON ALLSTEEL PRESS CO.

GAP PRESS — Incorporating safety and convenience provisions for protecting both operator and press, Verson gap press features fully-enclosed gears, flywheel, clutch and all other moving parts. In addition, piping and wiring of all air, lubrication and electrical components are totally enclosed in the press.

Die space area of the press is well-lighted for working convenience and there are receptacles and pockets for safety blocks to prevent the press from operating while men are working in danger areas. Service outlets of 440 and 110-v provide power for portable electric service tools; and a self-contained air supply system provides air-powered service outlets. Exact position of the ram at any point in the stroke is shown by an electric indicator. The complete electrical control system includes extra outlets and cams for tying press into automation lines and for automatically operating ejector type dies.

Circle 95 on postcard for more data



ELECTRO-MAGNETIC CONTROL

All controls are grouped on one accessible control panel which allows delicate finger-tip control by the operator . . . the machine responds *instantly*. This control allows any speed of ram travel in either direction.

SEMI-AUTOMATIC OPERATION

The forging cycle can be pre-set to incorporate any speed and tonnage—advance, press, slow return, fast return.

REMOTE MANUAL CONTROL

Manual control is easily detached from the control panel by the operator who is free to control the press from any nearby position.

HYDRAULIC TOP & BOTTOM STRIPPERS

Can be set to eject the forging from the die at *any* position.

NEW ADJUSTABLE GUIDES

Insure accurate platen alignment and *requires no shimming*. Adjustment can be made in less than an hour.

ERIE FOUNDRY'S NEW HYDRAULIC PRESS

with electro-magnetic control

produces precision forgings

1500-TON FORGING PRESS

platen size:	48" x 48"
opening:	60"
stroke:	48"
speeds—advance:	400" per minute
press:	adjustable from 0" to 52" per minute
slow return:	adjustable from 0" to 52" per minute
fast return:	360" per minute
hydraulic components:	Oilgear with Raytheon Servo-control

The Erie Foundry Hydraulic Forging Press was specially designed for no-draft non-ferrous forging. Modifications of this rigidly built, self-contained machine can be supplied to your forging requirements. For more information, please write.

ERIE

Hydraulic Press Division

ERIE FOUNDRY CO.
ERIE 5, PA.

GREATEST NAME IN FORGING MACHINERY SINCE 1895



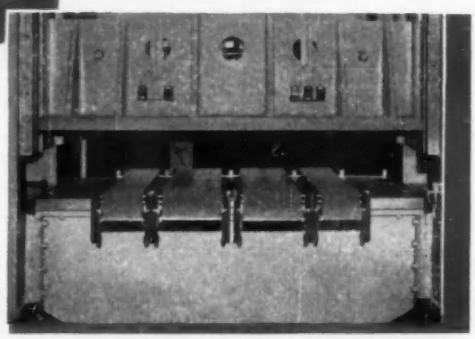
The operating ease and convenience that mean *Better Production at Lower Cost!*

Struthers Wells

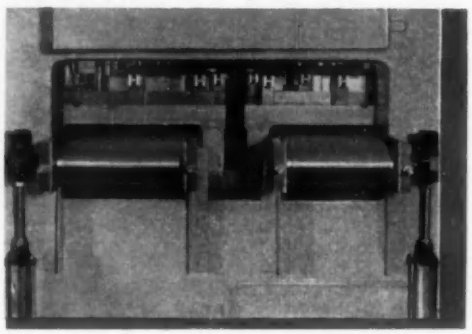
PUNCHING AND NOTCHING MACHINES

CAPACITIES: 200-300 Tons
SIZES: 36" to 60" front to back
LENGTHS: 96" to 140"

Struthers Wells Punching and Notching Machines have the features you need for productivity and profit! Massive, self-sustaining construction for low deflection and long die life. Off-center loading, permitted by wide gibbing. Left to right or front to back feeds. Good operating clearance for easy die mounting. Positive scrap cutoff *up to 20 ft* with SW die design. • Check these *Struthers Wells* advantages—let us bring you the facts, without obligation.



Efficient scrap removal is vital to economical production—side or end conveyors are available as specified.



STRUTHERS WELLS CORPORATION

Machinery Division: **TITUSVILLE, PENNSYLVANIA** · *Offices in Principal Cities*

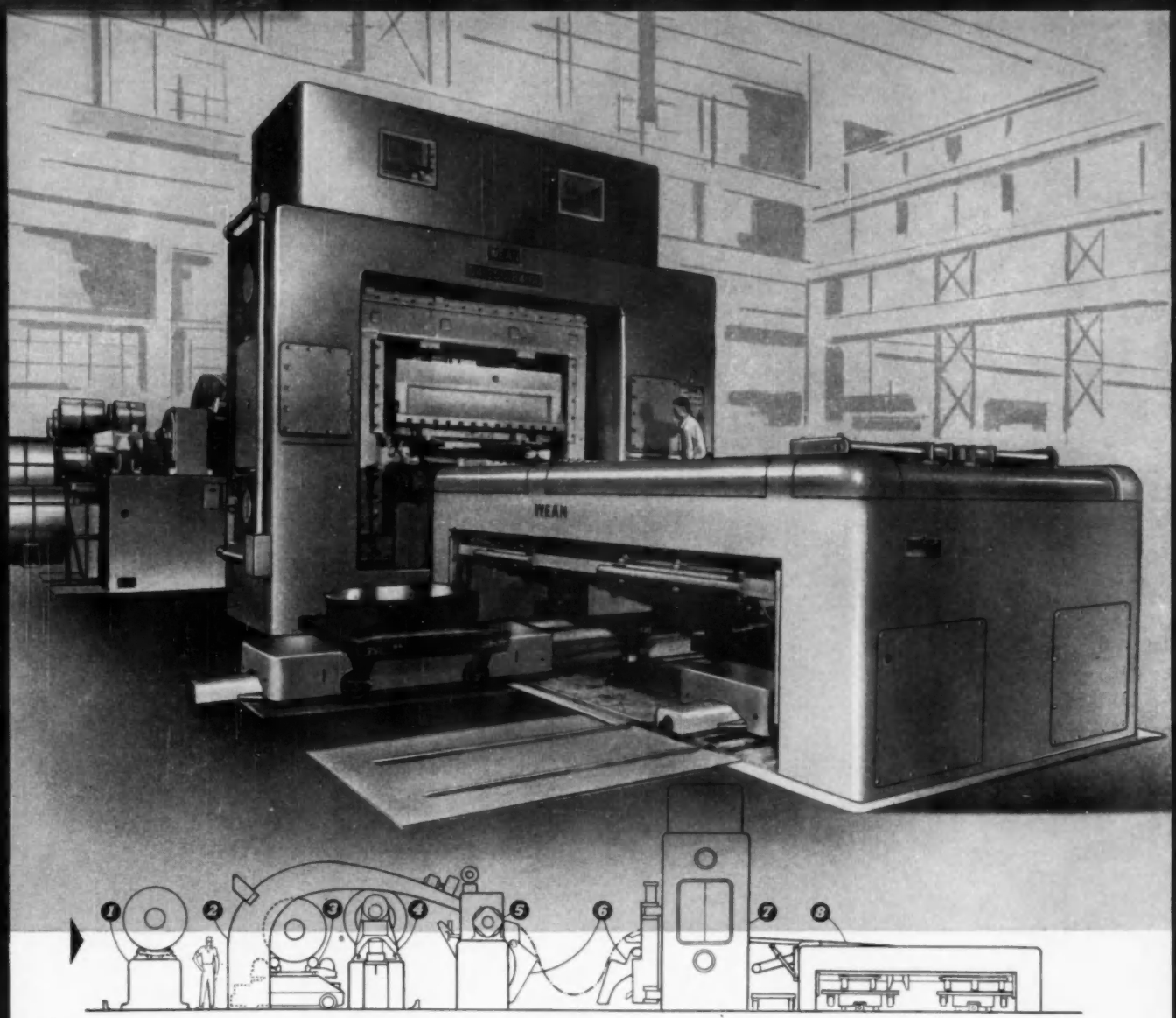
STRUTHERS WELLS PRODUCTS:

BOILER DIVISION
BOILERS for Power and Heat . . . High and Low Pressure . . . Water Tube . . . Fire Tube . . . Package Units

FORGE DIVISION
Crankshafts . . . Hydraulic Cylinders Pressure Vessels . . . Shafting . . . Straightening and Back-up Rolls

PROCESSING EQUIPMENT DIVISION
Crystallizers . . . Direct Fired Heaters . . . Evaporators . . . Heat Exchangers . . . Mixing and Blending Units . . . Quick Opening Doors . . . Special Carbon and Alloy Processing Vessels . . . Synthesis Converters

MACHINERY DIVISION
MACHINERY for Sheet and Structural Metal Forming . . . Tangent Benders . . . Folding Machines . . . Roller Table and Tumble Die Bending Machines . . . Press Brakes . . . Punching and Notching Machines . . . Forming Dies



1. Ready stand
2. Threading arms
3. Coil buggy
4. Cone-type Uncoiler
5. Leveler
6. Threading tables
7. "Flying-Press"
8. Automatic Piler

"Flying Press" Production Line

250 ton press line quadruples production of large heavy gauge parts

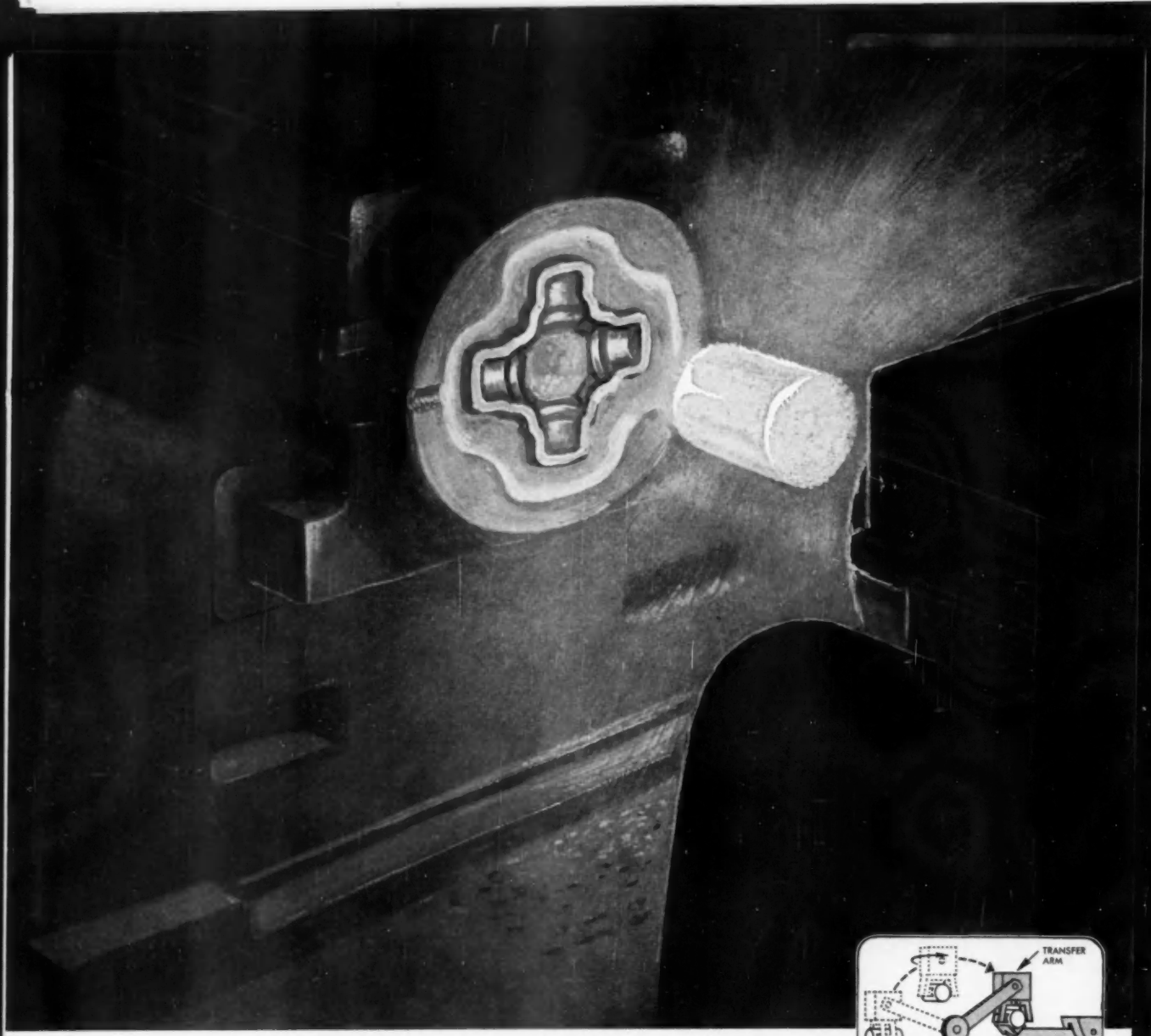
Dramatic proof of new production horizons is seen in the performance of this 250 ton "Flying-Press" production line engineered by Wean. Large heavy gauge automotive parts, formerly produced on modern presses, at rates up to 20 strokes per minute, are now produced on this Wean line at 90 strokes per minute.

The press is a 250-84-60 "Flying-Press." All components, from ready stand to stacking table, were engineered by Wean to work together as a single unit. Thus, the complete line is capable of producing at maximum press speeds. Consider, for a minute, how such production equipment can lower your per-unit manufacturing costs.

20 tons or 300 tons, whatever your press requirements, you will want the complete story on the "Flying-Press" and related units. Write today for your copy of the Wean "Flying-Press" Brochure.

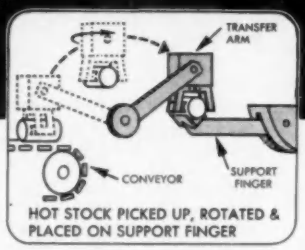
Wean Equipment Corporation
CLEVELAND 17, OHIO

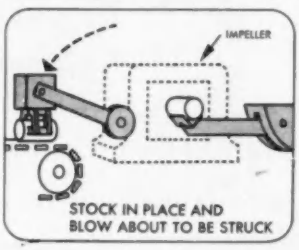
47A



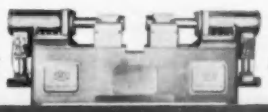
FORGING IN MID-AIR ... without grips ... without sprues ... without shock or vibration, *in a completely automatic operation!* This is but one of the possibilities in Cecomatic Forging based on the revolutionary Chambersburg Impacter and utilizing the Cecomatic Gravity Feed. Investigate the potentialities of the Cecomatic Process for forging production in varying degrees of automation. Write or phone us.

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.







Shockless, vibrationless forging  *in the IMPACTER is the basis of*

THE CECOMATIC FORGING PROCESS

47A

Weah Equipment Corporation
CLEVELAND 17, OHIO

They got what they wanted with

DANLY

PRESSES



SEE HOW ONE LEADING MANUFACTURER DOUBLED LAMINATION PRODUCTION

Production of motor lamination stampings was actually more than doubled—from 100,000 to 230,000 units per press per day—from each of five new Danly Autofeeds. High precision carbide dies have a life expectancy of 200,000,000 pieces . . . even stoppages for die maintenance have been reduced by 80%.

If you want speed, dependability, big volume and small unit cost, you'll get what you want with Danly Autofeed Presses. See how you can increase stamping production in your shop. You'll want the whole story. Send for this catalog with all the details including press specifications and drawings. Write today to DANLY MACHINE SPECIALTIES, INC., 2100 S. Laramie Ave., Chicago 50, Ill.

DANLY

Cincinnati Press Brake Dies

A COMPLETE CINCINNATI ENGINEERING SERVICE

COMPLETE DIE SERVICE

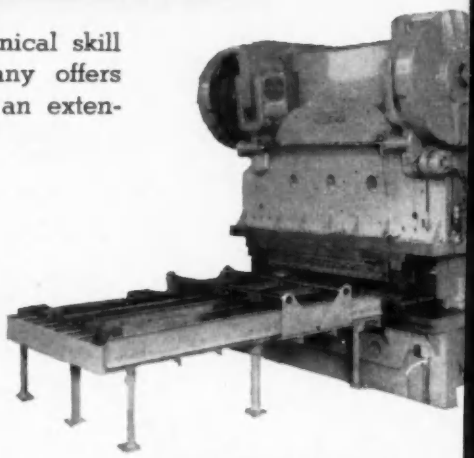
Selecting the proper tooling for a job requires the best technical skill and experience available. The Cincinnati Shaper Company offers complete facilities for designing and manufacturing dies for an extensive variety of products.

APPLICATION ENGINEERING DEPARTMENT

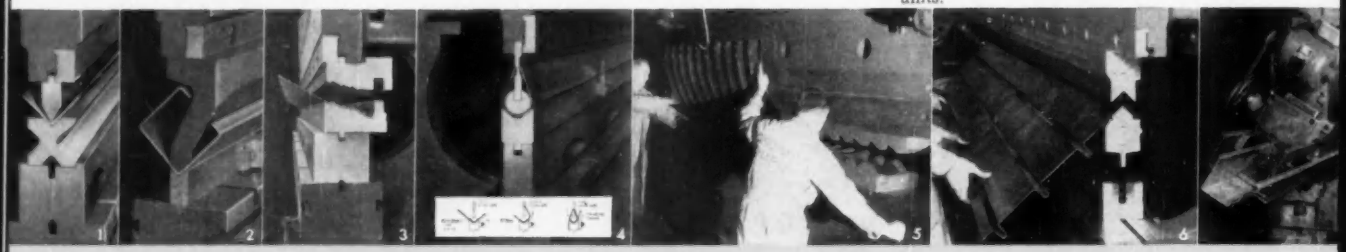
Our Application Engineers stand ready to give your production problems individual attention. A background of 30 years of widely varied experience is represented in this department.

DIE MANUFACTURING

We have machining, assembling and testing facilities for producing high quality tooling . . . for any Press Brake work.



This Cincinnati Press Brake punches and corrugates simultaneously. It is equipped with automatic feeding and withdrawal units.



A typical 4-way die, equivalent to 4 single vee-dies, is shown in photo 1. Photo 2 shows a gooseneck die and photo 3 shows a special die for producing 16 gauge molding. The closed U bend shown in photo 4 is formed in 3 hits.

The dies shown in photo 5 form corrugated culvert sections in successive hits. Steel roof decking is made with the "double-decker" dies shown in photo 6. The setup shown in photo 7 produces 2 miles of galvanized gutter per hour.



Tooling for punching grain bin sheets is mounted on special bolsters in photo 8. Spring plungers are used for strippers. Four edges of a control cabinet blank are punched and notched on the setup shown in photo 9.

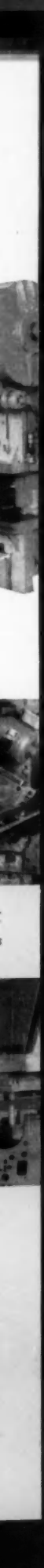
The progressive die setup shown in photo 10 is used for punching and drawing switchboard parts. Photo 11 shows a progressive die setup for producing television chassis.

The photos on this page show just a few samples of the Press Brake tooling and material-handling equipment designed and furnished by the Cincinnati Shaper Company. For more information, write Department W for Catalog D-2.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS · SHEARS · PRESS BRAKES



AI

AUTOMOTIVE INDUSTRIES

Processing Equipment Section

COATING

HEAT TREATING

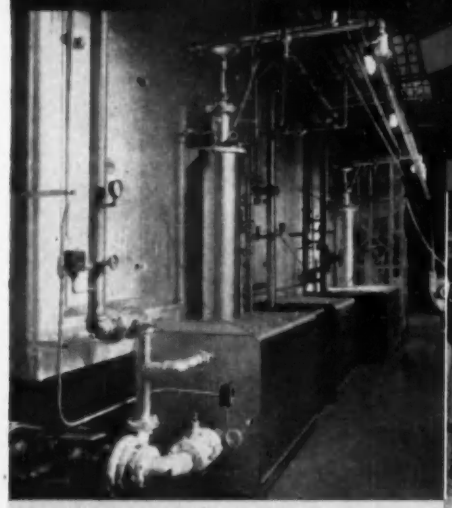
PAINTING

PLATING

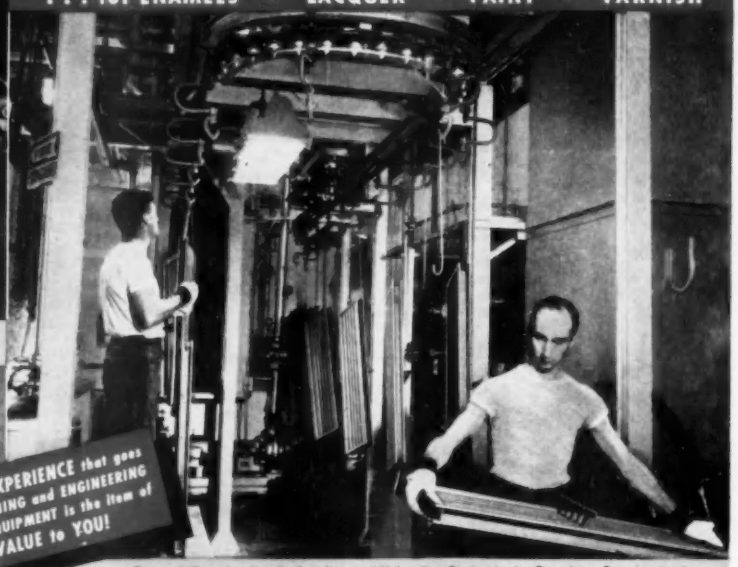
MACHINE TOOL AND PRODUCTION EQUIPMENT

COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH



Partial View of Mahon Five-Stage Metal Cleaning and Bonderizing Machine in the Airolite System. Note Patented Fire-Jet Heaters.

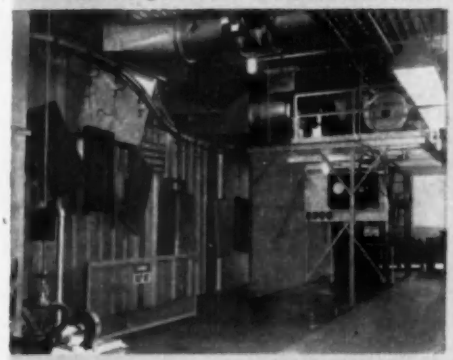


. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

General View showing the Loading and Unloading Station in the Complete, Conveyorized Mahon Finishing System recently installed in the Airolite Company's Plant, Marietta, Ohio.



Exit Opening in the Mahon Dry-Off Oven. This Oven is Combined with the Paint Baking Oven and Built as One Direct Gas-Fired Unit.



In the view above you see an Oven Heating Unit and a Control Cabinet which Houses Temperature Recorder and Safety Devices. Ventilated Solvent Vapor Chamber appears at left.

High Quality, Durable Finish on AIROLITE LOUVERS is Produced in a COMPLETE, MODERN MAHON SYSTEM!

The Airolite Company, Marietta, Ohio, manufacturers of high quality fixed and adjustable Louvers of all types, and numerous other metal products, have recently modernized production facilities which now include a complete, new Mahon Finishing System specially designed to accommodate all products presently in production as well as several items planned for the future. The new Mahon Finishing System in the Airolite plant includes a five-stage Metal Cleaning and Bonderizing Machine, Dry-Off Oven, Flow Coating Machine with a Ventilated Solvent Vapor Chamber, and a Paint Baking Oven . . . processing is continuous and automatic from conveyor loading to unloading. This is one of thousands of Mahon finishing systems that have been specially designed and installed in each case to meet the specific requirements of the manufacturer. If you have a finishing problem, or are contemplating new finishing equipment, you, too, will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the all-important planning, engineering and coordinating of equipment to produce the finest finish at minimum cost. See Sweet's Plant Engineering File for information, or write for Catalog A-657.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

Engineers and Manufacturers of Complete Finishing Systems — including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

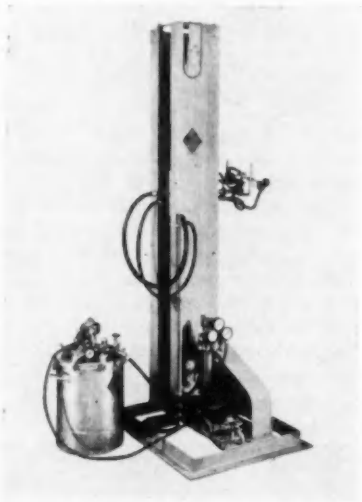
MAHON

PROCESSING EQUIPMENT

FOR ADDITIONAL INFORMATION
please use reply card on PAGE 183

PAASCHE AIRBRUSH CO.

PAINTING OSCILLATOR—A vertical oscillator recently built permits the automatic spraying of panels, boards, strips or other flat pieces carried on overhead conveyors. Automatic spray guns are carried up and down on a ball-bearing carriage and are controlled by adjustable, cam-operated valves to cut off spray at the end of each stroke. The explosion-proof motor with variable speed drive is adjustable to synchronize with conveyor speeds. The unit is supported on a heavy steel frame with provision for permanent installation.



Paasche vertical oscillator

Circle 100 on postcard for more data

E. I. DU PONT DE NEMOURS & CO.

CLEANING SOLVENTS — Nonflammable solvents that will remove oil, grease and dirt without harming delicate metal parts or electrical insulation, yet are safe enough to use in ordinary work areas with conventional ventilating equipment, are now available, according to the manufacturer. Adaptable to vapor degreasing or cleaning by liquid immersion, the solvents are marketed under the Freon trademark.

Because they are nonflammable and nonexplosive, they can be used in open shop areas without danger of fire. In addition, from an inhalation toxicity standpoint, they are rated as the safest of the commonly used nonflammable solvents when used in properly designed equipment which minimizes vapor losses.

Most important use proved to date, the company said, is in cleaning of electrical motors. Tests indicate that the Freon solvents will not injure any of the commonly used wiring insulation materials. Other applications developed for the solvents include cleaning of electronic instruments, and use as safe, efficient heat transfer agents in low-temperature laboratory chill baths.

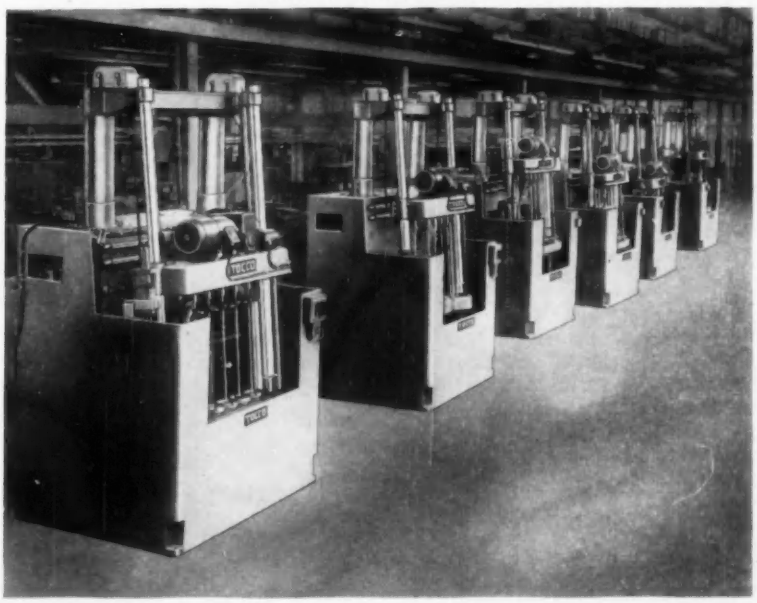
Three types of the solvents are available: Freon MF, with a boiling point of 75 F; Freon BF, which boils at 199 F; and Freon TF, whose boiling point is 118 F.

Circle 101 on postcard for more data

MAGNETHERMIC CORP.

INDUCTION HEATERS—Electronic induction heaters of 15, 30 and 40 kw rating are in a line recently announced. Each heater can be tailored to a specific heating application; 10 optional features, added to the stand-

OHIO CRANKSHAFT CO.



TOCCO-HARDENING AXLE SHAFTS—This battery of special TOCCO induction heating machines is used for hardening automotive axle shafts. Several of the major manufacturers have adopted this method of hardening rear axle shafts for passenger cars and trucks, because TOCCO-hardened shafts show an increase of up to 200 per cent in resistance to torsional fatigue over furnace-hardened shafts made of alloy steel. Furthermore, there is considerable economy in the TOCCO method, because induction heating permits the substitution of easier machining carbon steels for expensive alloys.

Circle 102 on postcard for more data

ard heater, making the new series unique in this respect. Options such as the following are available: built-in high frequency output transformer, stepless power control, built-in heat exchanger and pump, constant voltage filament supply, ceramic water columns, electronic keying and power tap switch. The heaters can be furnished either with a single or two-position output, depending upon the application.

Latest industrial-type power tubes



Magnethermic electronic induction heater

provide liberal overload capacity in both the oscillator and rectifier sections. The high oscillator tank kva rating permits efficient utilization of the heater in a wider variety of induction heating loads.

A full complement of instruments —plate current, plate voltage, grid current, and a control checklite system—facilitates operation, setup and maintenance.

Circle 103 on postcard for more data

THE PANGBORN CORP.

WET DUST COLLECTOR—The new Ventrijet wet dust collector manufactured by the Pangborn Corp. achieves the proper atomizing of water and mixing with the air stream to permit efficient dust transfer by the movement of air without mechanical means.

Dust laden air enters the ventrijet collector and expands in the inlet chamber at reduced velocity. The heavier particles sink to the bottom of the tank as sludge. The air is drawn through one or more venturi tubes into the discharge chamber. The low pressure area in the venturi throat induces water also to enter the high velocity air stream. The mixing of air and water causes the transfer of dust particles from the air to the water particles. The air, water and sludge mixture impinges at high velocity on special surfaces in the discharge chamber. The sludge settles to the tank bottom. The washed air then flows through an eliminator section for removal of droplets and clean air is discharged.

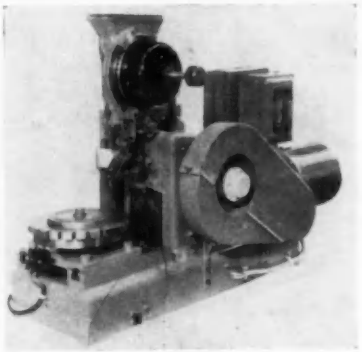
The Ventrijet is available in a range of capacities from approximately 1000 to 30,000 cfm in single and double row tube types.

Circle 104 on postcard for more data

MILFORD RIVET & MACHINE CO.

RIVETING MACHINES—Three new machines for special-purpose applications—Model FS, a multi-spindle pneumatic machine for production operations; Model TM, a pedestal-type machine with long stroke for riveting in deep channel sections and hard-to-reach areas; and Model RT-52, a fully automatic dial-fixture machine for light work are available from Milford Rivet & Machine Co.

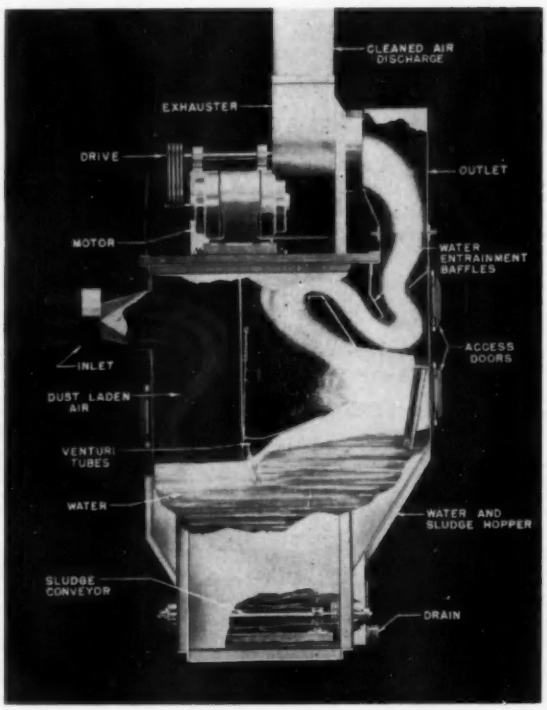
The multi-spindle pneumatic model, available with either pedestal or bench type base, can set tubular steel rivets ranging from ⅛ in. diam and 9/16 in. long down to 0.06 in. diam and 3/32 in. long. Currently being built with a four-spindle head for simultaneous riveting operations on long, flat parts, it can be made with from two to six or more heads, each fed by an automatic rotary hopper. Throat depth of the machine is 7 in.;



Milford Model RT-52 dial-type machine for riveting ball bearing retainers

stroke 1¼ in.; anvil height 40 in.; and minimum center distance between heads 3.67 in.

The long stroke machine, Model TM, was developed for riveting in deep channel sections, deep-drawn parts, or between ribs or fins of cast or molded sections. It is available with quick-change raceways that can be applied to feed rivets of various diameters and shapes. Having a



Ventriet wet dust collector

throat depth of 9½ in., it is capable of handling steel tubular rivets ⅛ in. diam by ⅛ in. long, through 3/16 in. diam by 1 in. length. Machines for various a-c voltages, from 110 through 440, are available.

The dial-type machine was developed to rivet ball bearing retainer rings, but it is also applicable to other riveting operations. The dial fixture is fully automatic. When the cycle is actuated, the machine table will index a full 360 deg through stations and automatically stop when completing the riveting operations. The fixture can be positioned to handle retainers from 2 to 6½ in. pitch diam, and the stations can be adjusted for from 6 to 36 positions. A feature of this, as well as other electrically-driven Milford machines, is a spring-loaded connnecting rod that automatically compensates for variations in material thickness.

Circle 105 on postcard for more data

NORTON CO.

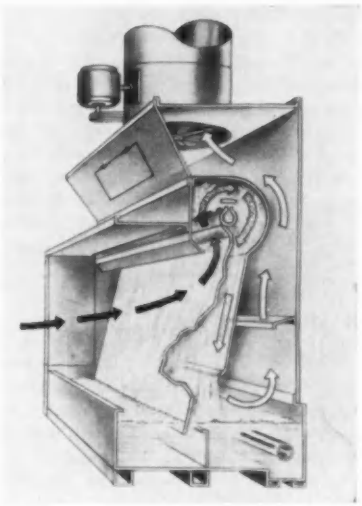
BARREL FINISHING MEDIA—Ideally suited for barrel finishing hard-to-contact recesses or intricate shapes, Tumblex "S" abrasive spheres come in five different diameters and are made of the company's Alundum aluminum oxide abrasive. These spheres are a satisfactory media for finishing tubing, coil springs, bearing retainers, pump bodies and other parts where conventional materials may tend to wedge or not reach. It is also said the spheres are dense and long-lasting, providing good cutting action with economy.

Circle 106 on postcard for more data

BINKS MANUFACTURING CO.

SPRAY BOOTH — Designed to remove virtually all air-borne pigment from the exhaust air, a new water wash spray booth has an improved air-whirl water wash action. Air is drawn through a continuous curtain of moving water which scrubs out suspended paint particles. In addition, paint particles are thrown against the adjacent walls and curtains by the centrifugal action of rapid changes in air stream direction. Water then flushes these particles into the collecting pan.

Identified as the Style E Dynaprecipitor, its construction permits the removal of major sections without tools. A throttling valve provides adjustment of water flow across the



Binks Style E Dynaprecipitor water wash spray booth

curtains. Other features include a hinged water curtain, and a sediment-free water intake supply.

Circle 107 on postcard for more data

OAKITE PRODUCTS, INC.

DRY ACID COMPOUND—Drycid is a powdered acid material which was recently introduced for removal of rust, scale and corrosion with added safety to metal surfaces as well as personnel. Used with water in concentrations upwards of eight ounces to the gallon, it is said to go into solution fast and to be useful in applications by circulation or immersion. Solutions of the compound may be used cold, or for faster action, heated to 165 F. It is said to be effective in the removal of scale, scale-like deposits, rust, iron sulphides and other oxides.

Stated major advantages of this new material include its ease in shipment and in storage, as it requires no returnable carboys but is shipped in fiber drums; its mild, aromatic odor and nonfuming characteristic; and its greater safety on aluminum, brass and galvanized surfaces when used as recommended.

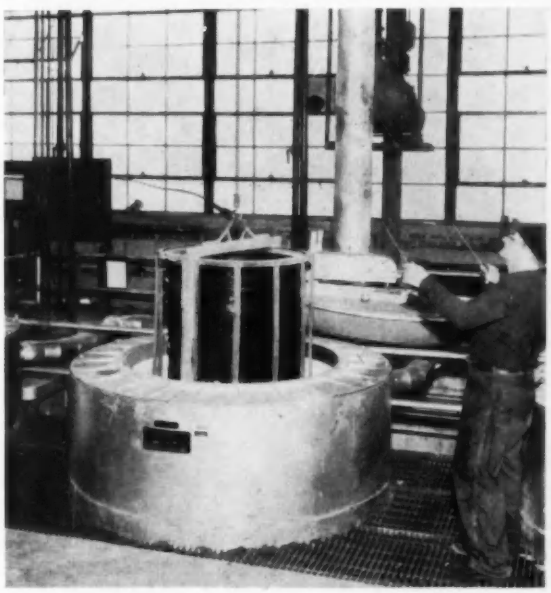
Circle 109 on postcard for more data

OAKITE PRODUCTS, INC.

PHOSPHATING COMPOUND—Identified as CrysCoat LT, a zinc phosphating compound for use at low temperatures in spray washing machines has been developed by Oakite. The new material is said to produce a fine-grained uniform coating which meets specifications MIL-C-490-A, Grade I, and MIL-C-16232A, Type II, calling for coating weights between 150 and 300 mg per sq ft on steel surfaces; with similar coatings being obtained on zinc.

Designed for application in five-stage washing machines, the com-

SURFACE COMBUSTION CORP.



HEAT TREATING FURNACE — A load of jet engine compressor blade rings is shown being unloaded from this specially-designed pit type draw furnace. Construction of the basket was arranged to facilitate discharging of the rings by use of an overhead hoist. One complete charge weighs about 940 lb. Tempering is carried out between 1100 to 1200 F, using cycles from two to six hours. Design of the Surface Combustion furnace is said to prevent erosion of the parts.

Circle 108 on postcard for more data

pound is stated to give quality coatings at temperatures between 120 and 140 F. It is also reported that the coating develops rapidly, including surfaces in deep cavities, thus minimizing rusting difficulties; that the solutions are easy to control; and that sludging problems are minimized.

Circle 110 on postcard for more data

G. S. BLAKESLEE & CO.

DEGREASER—A unit has been designed for any single type of degreasing or combination of methods, including vapor, vapor spray, liquid immersion and vapor rinse, double liquid immersion followed by vapor rinse, or liquid immersion, spray and final rinse. The unit incorporates ultrasonic transducers of 144 sq in. While this machine combines various methods to demonstrate the results obtainable from any one of these methods, the company states it is commercially usable and available to manufacturers requiring a flexible unit.

Circle 111 on postcard for more data

DEARBORN CHEMICAL CO.

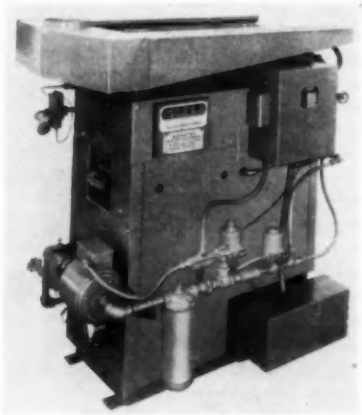
CORROSION PREVENTIVE—A new product No-Ox-Id Safeguard, is a water emulsion of waxes and oils in combination with selected corrosion inhibitors. When applied cold by dip or spray, it is said to form a transparent, highly-protective, wax-type film. No noxious or explosive fumes are emitted. After a brief drying and curing period, the coating cannot revert to an emulsion, nor will it wash off during outdoor exposure, according to the report. It is also said to resist fingerprint corrosion, whether the part is subjected to handling before or after application.

Circle 112 on postcard for more data

CIRCO EQUIPMENT CO.

ULTRASONIC CLEANERS—Seven standard ultrasonic cleaning machines are being offered in a line that was recently announced. Removal of buffing and polishing compounds, honing and abrasive materials, machining chips and non-soluble deposits, including those in blind holes and inaccessible recesses, is possible without hand labor.

High peak levels of ultrasonic energy are transferred to the cleaning chamber through stainless steel encased barium titinate transducers. At an operating frequency of 40 kc, maximum cleaning or cavitation is said to result with minimum energy input. Cleanliness of the chamber is maintained to a 10 micron efficiency by a high-flow removable honeycomb filter element. A centrifugal pump supplies circulation and spray lance



Circosonic cleaning machine

feed. The chamber is provided with a water-cooled jacket to maintain a temperature of 140 F. Self-actuating water control valve controls the water flow to hold the required temperature.

The machines are fabricated from heavy gage steel, zinc metallized or stainless steel clad. Available with steam, electric or gas-fired heating elements, equipment includes sump thermometers, drain valves, removable cleanout door, and bulb actuated water control valves.

Circle 114 on postcard for more data

BECK EQUIPMENT CO.

FINISH STRIPPER—Epoxystrip is the designation for an all-purpose finish-stripper which was introduced recently. Especially formulated to work on epoxy resin finishes, it will also remove paint; lacquer, enamel and other finishes from various metal surfaces. It is said that after about 20 seconds following application of the material, the treated epoxy resin will swell and come off. The residue can then be flushed away with water, leaving the metal surface clean and, after drying, ready for refinishing. One of its most important advantages, according to the company, is that it will not remove or damage phosphate coatings.

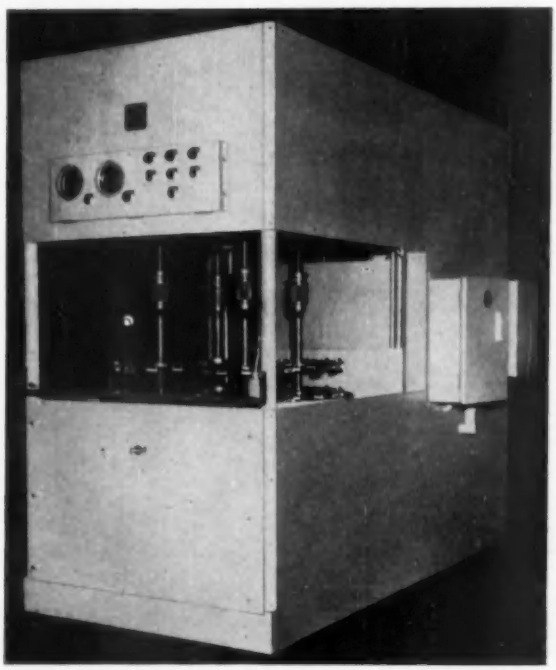
Circle 115 on postcard for more data

HANSON-VAN WINKLE-MUNNING CO.

ALUMINUM ETCHANT—Better-looking, more evenly etched aluminum surfaces and reduced costs result from the use of a newly developed aluminum etchant, according to a recent announcement. The 85S aluminum cleaner was developed for use as a caustic etchant bath, and is said

(*Turn to page* 144, *please*)

GRAV-I-FLO CORP.

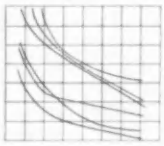


FINISHING PROCESS—Utilizing the machine illustrated, a mechanical finishing process known as Spin-Finish is said to promise a major change in methods for finishing brass, zinc-base and aluminum die-cast parts preparatory to plating. A multiple mounting of parts is finished in a single automatically-timed operation, using a dry compound. Parts fixtures are mounted on four double-action revolving spindles. Operating cycle varies from 4 to 16 min. Dust and fume-free, no blowers or ventilating systems are required. Parts complex in shape can be handled in one operation.

Circle 113 on postcard for more data

What every good metal man should know about CARBONITRIDING

First of all, it is a good idea to know what equipment will do the best carbonitriding job for your specific requirement. And the best way to find this out is to talk over your problems with the people who have consistently developed the methods and equipment for better, more dependable, more economical carbonitriding results. That would be Lindberg.



Let's look at the record. Lindberg's contributions to carbonitriding and carburizing go far beyond just the building of furnaces to do it. It covers the development of controlled atmosphere generators, the creation of dew point equilibrium curves to establish proper atmosphere values for type of steel and temperatures involved and the exclusive Lindberg Carbotrol to maintain these values automatically in production.



Typical installation of Lindberg Hyen Atmosphere Generator, Lindberg Carbotrol and Lindberg Carbonitriding Furnace.



Then there is the invention of the "dimple" vertical radiant tube which gave new efficiency and economy to fuel-fired atmosphere furnaces. Lindberg's exclusive CORRTHERM electric heating element made practical the use of electricity in atmosphere furnaces.



Add to this our record over the years of building a broad variety of carbonitriding and carburizing furnaces, big ones, small ones, manuals, automatics, fuel-fired, electric, and it seems it's just good common sense to bring your heat treating problems to us. Just get in touch with the Lindberg Field Representative in your locality or write:

LINDBERG ENGINEERING COMPANY

2450 West Hubbard St., Chicago 12, Illinois

Los Angeles Plant: 11937 S. Regentview Ave., at Downey, California.



LINDBERG

heat for industry

(*Continued from page* 142)

to be an effective means of cleaning and brightening aluminum surfaces. It contains an inhibitor for eliminating the formation of scale on tank walls and coils. It also reportedly supplies a built-in means of minimizing the formation of sodium aluminate, an etching inhibitor at high concentrations, providing maximum utilization of the caustic soda.

The company furnishes process instructions for the use of the material. For example, the bath is initially made up with 8 oz/gal of 85S etchant. As the sodium aluminate builds up, the etchant concentration is increased to exceed the sodium aluminate content by 3 oz/gal. By maintaining this excess etchant content, it is said the bath can be operated for long periods without dumping, since hydrous aluminum oxide will settle out in the form of sludge. Dumping is necessary only when the sludge becomes excessive, in which case it can be flushed through sewage facilities or recovered, if desired.

Circle 116 on postcard for more data

LINDBERG ENGINEERING CO.

HEAT TREATING FURNACE — A furnace called the Induct-O-Ring offers two completely new engineering features. It is designed for carbonitriding, bright hardening, and carburizing of small parts. The most interesting development is the use in a heat treating furnace of the induction heating principle, which makes possible the elimination of heating elements, element terminals, burners, gas or electric connections in the furnace proper. Another interesting feature is the circular shape of the unit. This eliminates the usual heat and atmosphere losses occasioned when conventional furnace doors are opened to charge and remove the workload.

Company engineers state that a primary advantage of the furnace is its high heating efficiency and high heating rate, hardening temperatures being reached in 17 minutes from cold. All the heat is in the work chamber and workload, held in by a heat-resistant alloy liner embedded in insulation.

The operation of the furnace is automatic and simple. The circular furnace has a reciprocating motion. It turns slowly in the direction of work travel, then quickly reverses. With each action the work remains in the forward position and regularly progresses through the chamber until it reaches a discharge chute. The furnace moves on sealed ball bearings and each movement ends against an air cushion. The motion also is utilized to feed workload into the furnace, and various types of hoppers to fit different parts are available.

The Induct-O-Ring is a completely self-contained unit. Quench tank, quench conveyor, and quench cooling coils are enclosed in the base of the unit. Control panel is wired and only air and power connections are required. The furnace is adaptable to automated production processes.

Circle 117 on postcard for more data

ROCHESTER DIV., CONSOLIDATED ELECTRODYNAMICS CORP.

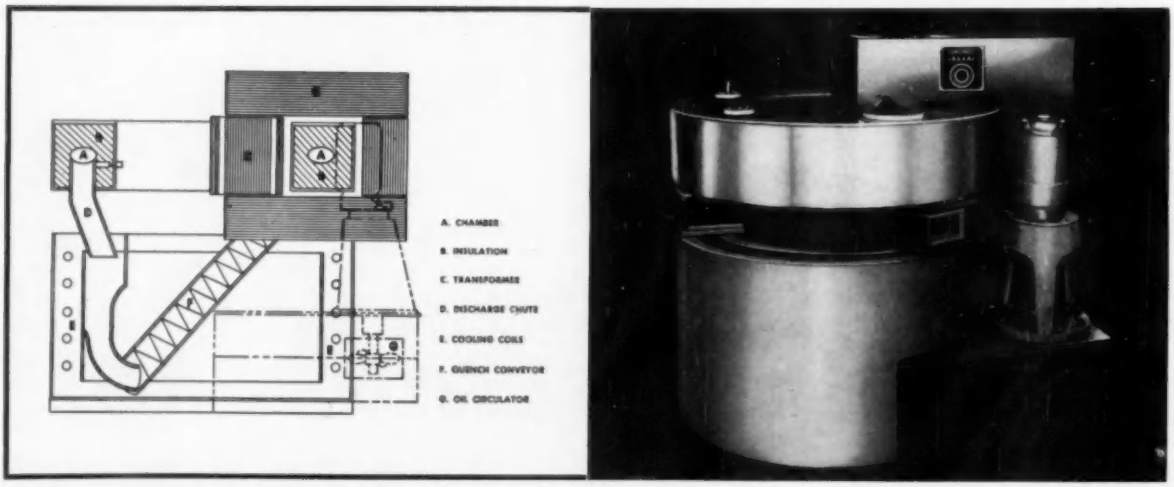
VACUUM SYSTEM UNIT — Intended for laboratory, pilot plant and limited production use, a vacuum system unit is now available that was designed primarily for coating of various materials with vaporized metals. It is also usable for degassing liquids, crystal pulling and growing, and melting metal samples. Known as the Type LC1-18-A vacuum system, it features a high-capacity pumping system which reduces pumping time, and offers a line of accessories for added versatility.

The pumping system includes a three-stage oil diffusion pump and affords a choice of 13, 15, 27, or 130-cfm mechanical pumps for roughing and backing. These pumps are operated by circuit breakers and are interlocked to prevent improper sequencing. Pump-down time with a clean, dry system is five minutes to 0.5 micron Hg, with an ultimate pressure of 3×10^{-5} mm Hg. With a fractionating oil diffusion pump substituted for the three-stage pump, an ultimate pressure of 3×10^{-6} mm Hg can be reached. Pressures in the work chamber and fore-pressure lines are measured by new discharge and Pirani gages from 2 mm to 1×10^{-7} mm Hg. A leak detection feature of this Pirani utilizes its sensitivity to detect leaks from 1 micron to 10 mm Hg pressure.

An 18- by 30-in. Pyrex bell jar is the work chamber. It seats on a baseplate which has holes for vacuum-gage sensing tubes, filament heating electrodes, and optional accessories.

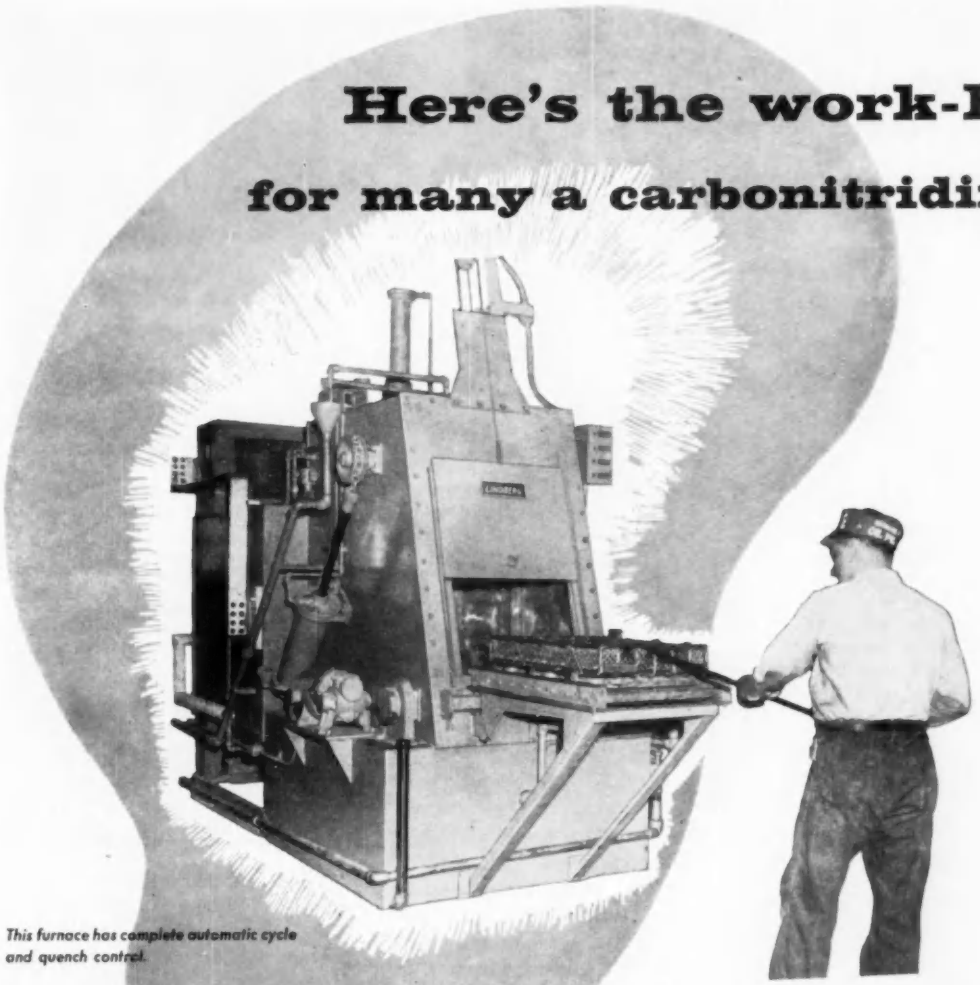
Circle 118 on postcard for more data

(*Turn to page* 148, *please*)



Lindberg Induct-O-Ring heat treating furnace features induction heating and novel circular shape

Here's the work-horse for many a carbonitriding job



This furnace has complete automatic cycle and quench control.

This is the most widely-used carbonitriding furnace of all. Day in and day out production of tons and tons of work has proved this furnace's ability to increase production quality and volume and reduce costs. It is a versatile furnace, too, not only for carbonitriding but for other uses, carburizing, annealing, carbon restoration and many hardening applications.

This type of furnace is available for both manual and automatic operation. It can be equipped either with Lindberg's efficient new vertical radiant tubes for fuel-firing or for electric heating with Lindberg's revolutionary new CORRTHERM element.

Versatile as this furnace is, we don't claim it is the best solution to *every* carbonitriding problem. But, whatever your need may be, talk it over with Lindberg. Our engineers, as they have done in so many instances, will recommend a sound answer—design it, build it, even field-install it if you wish. Just get in touch with the Lindberg plant or the Lindberg Field Representative in your locality. Lindberg Engineering Company, 2450 West Hubbard St., Chicago 12, Illinois. Los Angeles Plant: 11937 S. Regentview Ave., at Downey, California.



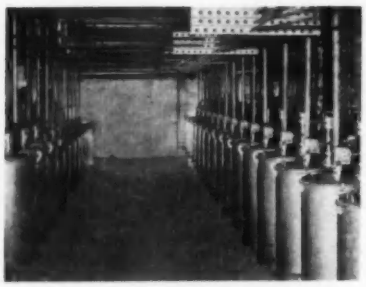
LINDBERG

heat for industry

How Ionia keeps scores of matched colors at each spray booth

The Ionia Manufacturing Division of The Mitchell-Bentley Corporation, Ionia, Michigan, is said to be the world's largest independent producer of automotive bodies. On any given production schedule you may see station wagon bodies for two General Motors Divisions and one Ford Division. Or it may be that you will see trim and subassemblies for Studebaker-Packard, American Motors, Chevrolet and the Fisher Body Division of GM in all stages of production.

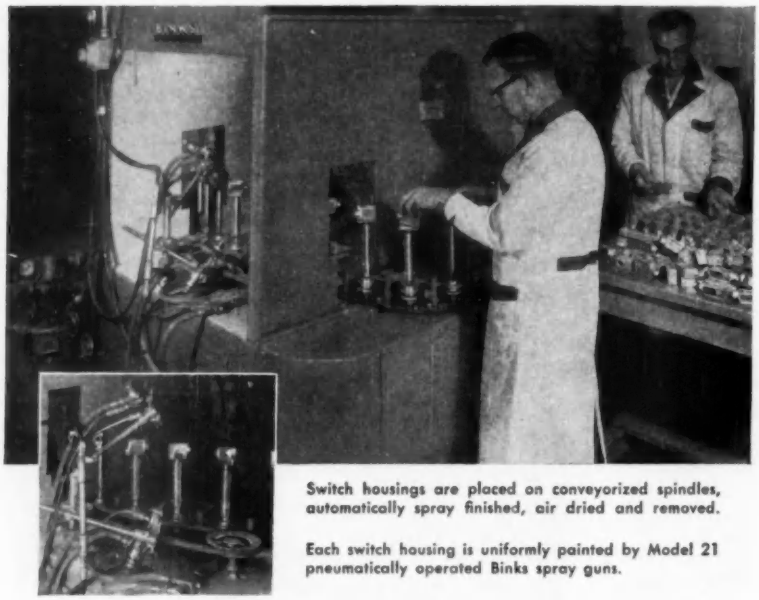
Ionia must be prepared to apply a wide range of colored finishes. Identical colors must be available at a number of points in the plant to insure perfect color matches in the finished products. To meet this need, Ionia installed a paint circulating system.



Tanks and pumps such as these Binks units are the heart of Ionia's paint circulating system. Air operation of paint agitators and pumps eliminates any hazard of electrical connections.

The first benefit to be derived was the ability to exercise laboratory control over all paint preparation and storage. Each color is placed in its own tank in a central paint room. Air-motor driven agitators keep all the accurately compounded paint elements in proper suspension. Each paint tank has an air-operated material handling pump. This pump is used to send a steady, regulated flow of paint through a pipe which makes a complete circuit past each spray booth and back to the tank.

At present, 70 such pumps are used and the entire paint circulating system utilizes 12 miles of piping. The paint tanks, agitators, pumps and all attendant pressure and flow regulation equipment items were manufactured by Binks Manufacturing Co., 3120-30 Carroll Ave., West, Chicago 12, Ill.



Switch housings are placed on conveyorized spindles, automatically spray finished, air dried and removed.

Each switch housing is uniformly painted by Model 21 pneumatically operated Binks spray guns.

A Binks automatic spraying machine at MICRO SWITCH...

"paid for itself in three months ...boosted finishing output 400%"

"We are now able to paint up to 945 switch housings an hour," reports Mr. Walter Gage, finishing foreman for the MICRO SWITCH division of Minneapolis Honeywell Regulator Company, Freeport, Ill. "This is four times our previous hand spraying rate and we use one-third the manpower."

Fast, uniform finishing

Switch housings are placed on conveyorized spindles which rotate as they pass through the spray booth. Binks pneumatically operated Model 21 automatic spray guns apply a uniform coating on all surfaces as each spindle passes.

Engineering help available

Working with your engineers and production people, Binks spray finishing engineers can help you cut costs...boost production...improve quality. Because Binks line of spray finishing equipment is so complete, they need not compromise in the selection of any part of a finishing system. The "right" equipment combination for your every production need, is always available.

For complete information

Contact your nearest Binks Branch Office or write direct to the address below.

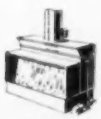
Ask about our spray painting school
Open to all...NO TUITION...covers all phases.

6080

Binks
EVERYTHING FOR SPRAY PAINTING


SPRAY GUNS

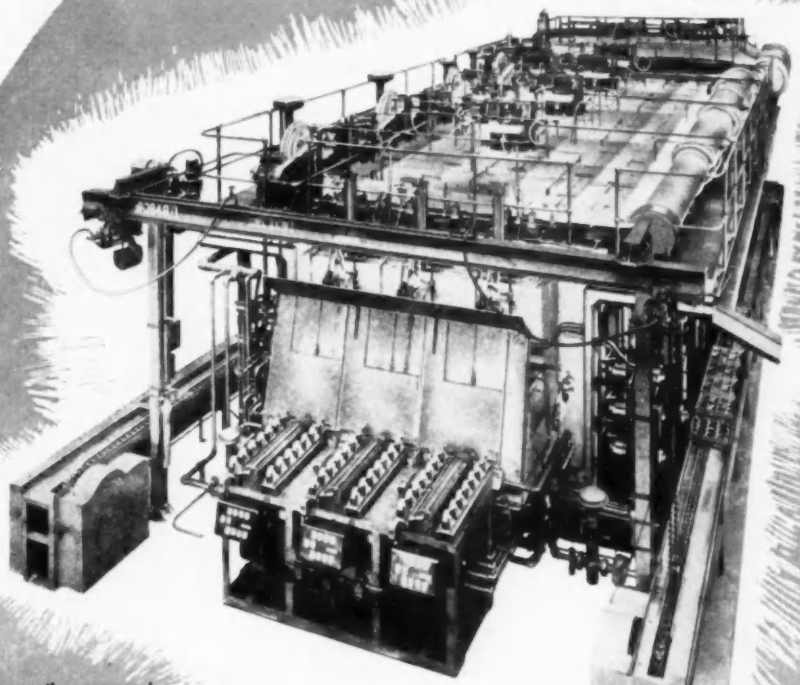

AIR COMPRESSORS


SPRAY BOOTHS

Binks Manufacturing Company
3120-30 Carroll Ave., West, Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

We put the Big Heat on with this one!



A Lindberg continuous three-row pusher carbonitriding and carburizing furnace, gas-fired with vertical radiant tubes. Can also be built with CORRTHERM electric heating elements.

If your carbonitriding or carburizing problem is a big one, better talk it over with Lindberg. The broad experience of our engineering staff in the development of methods and equipment for every heat treating function offers a pretty sure promise of the most practical answer to it. Particularly where field installation is advisable our combination of engineering know-how and sound installation experience is especially valuable to you.

Whether your requirement will call for the installation of a big baby like the one shown above or a complete heat treating department of smaller units, Lindberg will handle the job all the way. We specialize in "turn-key" installations, covering everything from design and engineering to the finished ready-to-go-to-work job complete with all the construction needed to fit the heat treating equipment into your production processes. Pass your problem to Lindberg. Get in touch with Lindberg Industrial Corporation, 2321 West Hubbard Street, Chicago 12, Illinois, or your local Lindberg Field Representative. Los Angeles Plant: 11937 S. Regentview Ave., at Downey, California.



LINDBERG

heat for industry

(*Continued from page* 144)

EVERLUBE CORP.

HYDROGEN EMBRITTLEMENT—As a guard against hydrogen embrittlement, a marking material called Tempa-Dot has been introduced for use on heat treated parts that have been electroplated, pickled or phosphate coated, to give a visual indication that each part has been baked to relieve hydrogen embrittlement. Upon application it appears as a vivid red dot, changing color after the proper bake. Its color reaction is said to be sufficiently accurate to show a ±25 F deviation.

Circle 119 on postcard for more data

RANSOHOFF, INC.

CLEANING MACHINE — Comprising two integrated sections, a cleaning machine recently developed is a combination continuous drum and belt conveyor type unit. Small work or parts are washed, rinsed and dried in the drum section, and larger work or tote pans are processed at the same time in the conveyor section. The drum and conveyor type components are contained side-by-side in the same machine housing and integrated so that the same pumps, tanks, blowers and heating equipment serve both sides.

Design of the machine is versatile to permit incorporation of pickling, neutralizing, phosphate coating or similar processes. Tanks and drying air may be heated by gas, steam, oil or electricity as required.

One-man operation is provided by return conveyors. Small work or parts processed in the drum section are automatically returned by belt conveyor to the charging end. Larger parts processed in the conveyor section are discharged onto a gravity type conveyor for return to the charging end. Completely automatic operation can be furnished by integrated loading, unloading and transfer equipment.

Circle 120 on postcard for more data

RADIO FREQUENCY CO.

INDUCTION HEATERS — Incorporating powdered core output transformers, a line of induction heaters is said to make possible ultra-fast induction hardening. A cited specific application is the spring-shackle bolt shown in the photo. The requirement was to harden the knurl to a depth of approximately 0.012 in., without hardening or heating the head of the shank adjacent to the knurl or the shank under the knurl. The pin is driven into a hardened spring and the knurl must be hard to penetrate and hold. The head, however, must be soft enough to take the blow of pounding, without shattering.

The stated problem, therefore, was to develop a new type of heater that would provide ultra-fast heating. Ordinary induction heating techniques could reportedly provide a minimum heating time of one second with a 20-kw unit. But this time length allowed the shank to be heated, and the only solution to this was spraying with water. By using the ultra-fast induction heater, this same operation may be accomplished in 1/10-sec on a 10-kw machine. Because it is accomplished so rapidly, no quenching is required, the residual cold of the pin doing the quenching; and the knurl is the only portion that is heated and hardened.

With these heaters all the operator is required to do is to push the pin into the coil, where it automatically turns on the machine for the desired time interval and remove it.

Circle 121 on postcard for more data

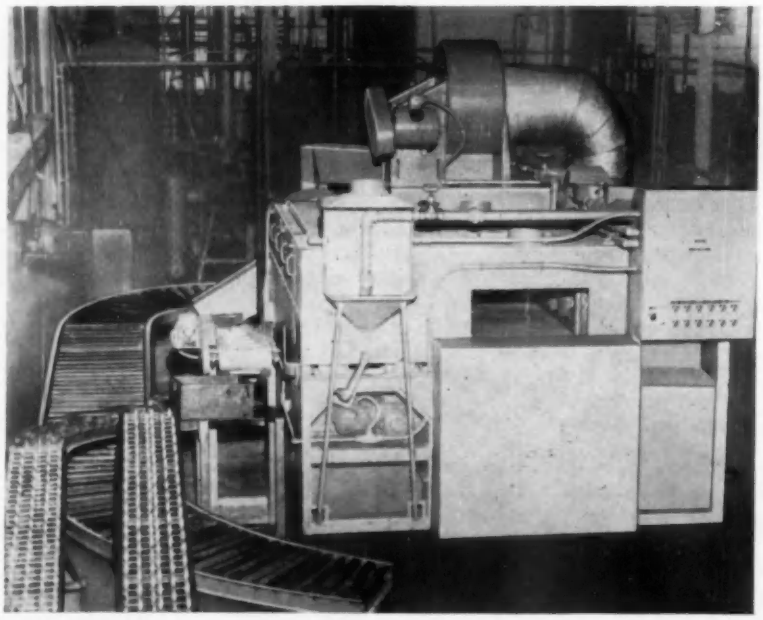
ECLIPSE FUEL ENGINEERING CO.

HEAT TREATING SYSTEM—Called the Clean-Line, a new controlled-atmosphere heat treat system is available in a complete package installation, with matching combination heat treat furnace and quench tank, endothermic generator, tempering unit, and automatic washer.

Basic unit in the system is the automatic controlled-atmosphere heat treat furnace for hardening, carbonitriding, carburizing, carbon restoration, and annealing up to a maximum operating temperature of 1850 F. Automatic straight-through handling of work is provided with a power pusher moving the work into the heating chamber, and a separate pusher head transferring work to the rack in the quenching chamber. The quenching cycle is automatic, with the rack being raised and lowered by a pneumatic cylinder. A two-stage, 300-gpm pump recirculates the quenching oil. A jet agitator system helps circulate the oil through densely-packed loads for greater overall uniformity of hardening.

The heat treating unit is fired by eight gas-fired, vertical burners, and furnace is equipped with alloy radiant tubes, four on each side of the chamber, to give even heating of the atmosphere throughout the furnace. Quenching and heat treating chambers are separated by an alloy refractory-lined intermediate door which is interlocked with the air-operated sealed front door to prevent jamming.

Circle 122 on postcard for more data



Ransohoff combination continuous drum and belt conveyor type cleaning machine

AI

AUTOMOTIVE INDUSTRIES

AUTOMATION and MATERIAL HANDLING SECTION

CONVEYORS

INDUSTRIAL TRUCKS

INDUSTRIAL TRAILERS

CONTROLS

TRANSFER UNITS

FEEDING DEVICES

PRESS UNLOADERS

MACHINE TOOL AND PRODUCTION EQUIPMENT



Over 225 blue-eyed Indians roam NAVAJO trail with ROADRANGER® Transmissions

The Indian sign for fast, efficient motor freight transport is found on the highways ¾ of the way across the nation! Navajo Freightlines, Inc. of Denver, sends more than 225 Autocar, White-Freightliner, Diamond T, and International tractor equipped rigs—most of which are equipped with Fuller 10-speed R-96 ROADRANGER Transmissions—over 30 million miles of Navajo trail annually.

Bill Gregory, Maintenance Superintendent of Navajo's Denver Division, says: "We like the Fuller 10-speed R-96 ROADRANGER Transmission for its simplicity, easy shifting and ability to provide 10 forward speeds in the shortest possible dual drive tractor."

The R-96 ROADRANGER, with 10 selective ratios evenly and progressively spaced in short 28% steps, gives Navajo drivers *complete control* of every situation . . . provides the flexibility of operation required to meet every varying condition of time, traffic and terrain. It makes Navajo drivers safer on the trail.

You too can profitably apply Fuller semi-automatic ROADRANGER Transmissions to your operation. Ask your truck dealer now for full details on the easiest-shifting transmissions available for your fleet. Specify Fuller ROADRANGER Transmissions for faster trip time, lower fuel consumption longer engine life, less driver fatigue and greater profits. Fuller Manufacturing Company (Transmission Division), Kalamazoo, Michigan.

FULLER



TRANSMISSIONS

Autocar Tractor with NH Cummins diesel engine and Fuller 10-speed R-96 ROADRANGER Transmission—ready to roll for Navajo.



AUTOMATION AND MATERIAL HANDLING EQUIPMENT

FOR ADDITIONAL INFORMATION
please use reply card on PAGE 183

SHEFFIELD CORP.

PRESS TRANSFER UNIT—A mechanical transfer unit to convert any standard press into an automated press capable of handling a number of progressive operations and a broader range of sizes was recently announced. Called the "Press Pacer," it is a portable unit that transfers stampings from one die station to the next on each stroke of the ram. It can also be used to transfer parts between presses.

The unit is completely mechanical in operation. There are no electrical, pneumatic, or hydraulic connections or movements. It is capable of moving parts through a number of die operations such as blank, draw, pierce, and trim simultaneously. The "Press Pacer" is adjustable for different spacings between dies and also for different ram strokes. It can be installed to run either front to back or left to right. The unit is bolted to the bed of the press.

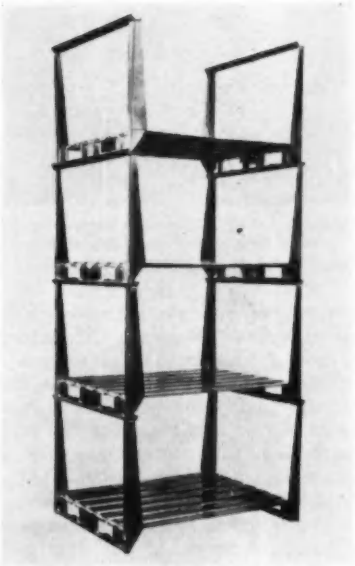
The minimum size press in which the standard model can be used has a bed area approximately 42 by 72 in. and a 14 in. shut height. The standard model has a stroke adjustment up to 12 in. and a transfer distance adjustable to any increment within the 8 to 36 in. range.

Essentially the unit consists of a pair of transfer rails, one on each side of the press, on which are mounted opposed pickup fingers that transfer the parts to the next station on each upstroke of the ram. Transfer motion is obtained by means of a lever arm bolted to the ram. The pickup fingers are easily changed to accommodate different size parts.

Circle 125 on postcard for more data

PRESSED STEEL DIV., REPUBLIC STEEL CORP.

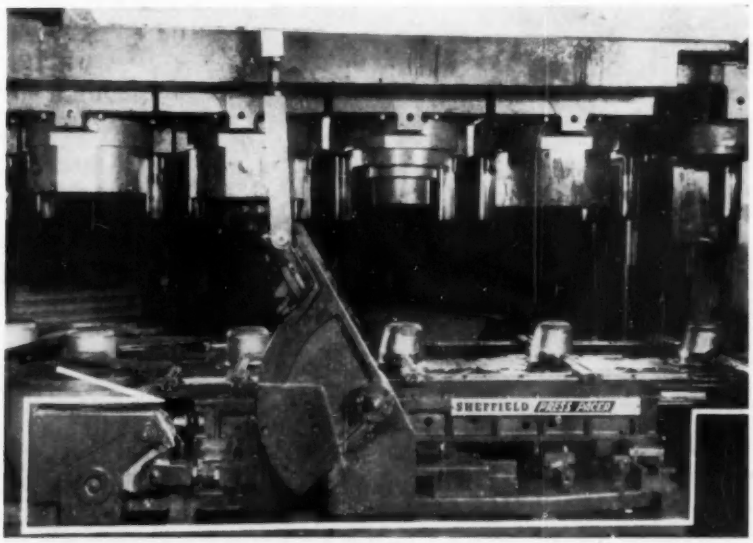
PORTABLE STACKING RACK—A versatile stacking rack, designed for handling and storage of package materials, products or parts which cannot be stacked without support, has been developed. The open-side steel frame units bring portability to the field of shelving because they can be moved by fork lift or platform truck, according to the needs of production and inventory. If required, they can be used as "handling" racks and moved to a work or processing area to receive finished parts. At the same time, they can be stacked to any practical height when loaded or unloaded, and can be used to form either permanent or temporary warehousing facilities in any available area.



Portable open-side stacking rack

The open sides of the units facilitate order picking, tally and inventory work. Varying in size, the units are made to specification according to the size and shape of the material to be handled. Such material can be in the form of a package, carton, or balanced-weight part or end product.

Circle 126 on postcard for more data

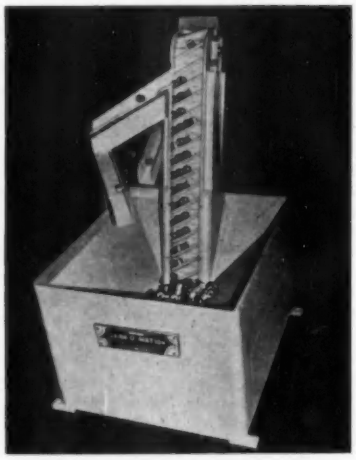


Outlined in white is the Sheffield "Press Pacer," a mechanical transfer mechanism adaptable to a wide range of presses. It is capable of transferring parts through sequential operations in a single press or a series of presses.

MICHIGAN TOOL CO.
GEAR-O-MATION DIV.

FEEDING DEVICE—To provide a high-speed method for automatic elevating, orienting and feeding of parts to automated production lines, a combination feeding unit will handle parts which roll or slide, such as gears, cylinders and spiders. The feeders are adaptable to any parts-feeding job, especially for feeding parts to individual machines.

In operation, parts are conveyor-fed or truck-dumped into the hopper section of the unit. From there they



Gear-O-Mation feeder elevates, positions and feeds rolling or sliding parts

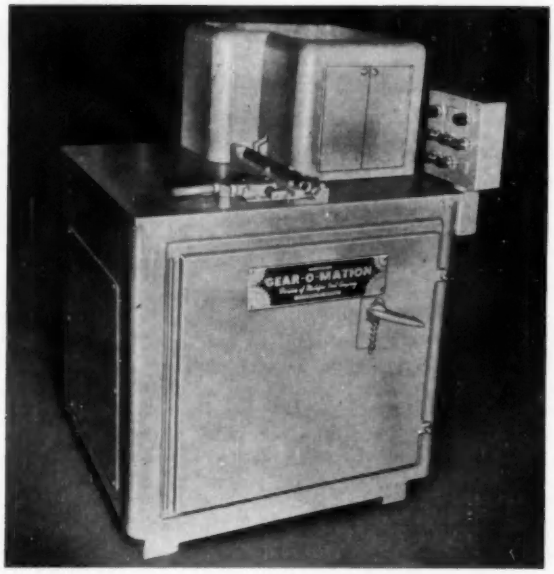
are scooped onto slanted shelves for elevating and feeding to a distribution system. When elevated, properly positioned parts roll through; while improperly positioned parts are chuted again to the hopper as they fall free on the back side. Before passing into the main distribution system, parts from the elevator are again checked as to orientation by being passed over a narrowed track. If not "in line" they drop off and are returned to the hopper.

Elevator height, capacity and feeding take-off rate are variable to suit the application.

Circle 127 on postcard for more data

MICHIGAN TOOL CO.
GEAR-O-MATION DIV.

SKEW LOADER—A new unit designed for the automatic skew loading of gears prior to heat treating is available. Using the loader an operator can load 4200 face-oriented gears per hour onto a gear carrier. Although designed primarily for high-



Gear-O-Mation skew loader loads 4200 gears per hour for heat treating. Electrically controlled, pneumatically operated, the unit uses no electric motors. Designed for fully automated production lines, it is applicable to a number of uses.

volume gear heat-treating operations, the skew loader is expected to be applicable to many other center-bored parts and production setups.

In operation, the gears enter the skew loader through a gravity expandable track and are stopped by an escapement mechanism. From the escapement, gears are fed one at a time into a V-track and are pushed forward by the plunger of an air cylinder actuated by a proximity switch. The air cylinder, returning to neutral, triggers a limit switch-controlled solenoid which releases another gear. This action takes place in split seconds—an average skew load of about 14 gears is readied in less than five seconds. When a full load is positioned, the operator inserts the skew (or rod) through the center-bored holes and lifts the load onto a gear carrier. Operator action is almost continuous at the loader's high speed.

Versatility is also a feature of the loader. It will not only load similar gears but can be converted to much larger or smaller gears by changing the retaining fixtures. Push button-controlled, the unit can be run manually as well as fully automatic. Operation is pneumatic from shop pressure, with no electric motors. It is built to JIC standards; size is 36 by 36 in.

Circle 128 on postcard for more data

CLARK EQUIPMENT CO.

OUTDOOR LIFT TRUCK — Power brakes, power steering and finger-tip directional control are standard on an 8000-lb capacity, pneumatic tire fork-lift truck, the Yardlift 8024. With four speeds in each direction, the truck will travel at 16½ mph forward and 16 mph reverse, and climb a 21 per cent grade loaded.

A "feather-action" spool-type valve with built-in pressure relief controls the hydraulic system and provides lift speeds of 48 fpm empty and 42 fpm



Clark Yardlift 8024 outdoor truck

loaded. The axle-mounted telescopic upright tilts 4 deg forward and 12 deg backward. An automatic "tilt-lock" valve prevents upright drift.

With a length of 132 in. and width of 77 in., the Yardlift 8024 has a

turning radius of 134¾ in. Wheelbase is 86 in.

The unit is powered by a six-cylinder Continental gas engine of 209 cu in. displacement. The drive axle is a ful-floating spiral bevel pinion and ring gear type. A 12 in. diam single disk, dry plate clutch, with capacity of 245 lb-ft of torque, is controlled by foot pedal.

The vacuum power operated hydraulic brakes provide 180 sq in. of braking surface. An independent hand-controlled parking brake operates off the drive shaft. Power assist steering is of the continuous follow-up type, and operates uniformly throughout the engine speed range.

Circle 129 on postcard for more data

CLARK EQUIPMENT CO.

OUTDOOR FORK TRUCK—The operator sits above the left front fender for a clear view of the load on a 35,000-lb capacity pneumatic-tire fork truck. Named the Clarklift Y-350, it was designed for heavy lifting and tiering work in outside locations. Power is provided by a Hercules six-cylinder gasoline engine of 404 cu in. displacement through a power-shifted, four-speed transmission coupled with a torque converter. Tire size is 14.00-24.

Placement of the driver at left front gives full visibility when raising or placing a load. Direction selector levers and lift-lower-tilt levers are located on the steering column for fingertip control. Power steering and air service brakes are standard. The hydraulic system is controlled by a feather-type valve with built-in adjustable relief valves, and gives a lift speed of 26 fpm loaded. Accessibility for servicing is provided by a hood which slides back on rollers to expose the engine completely.

The Clarklift Y-350 has underclearance of 14 in. at the upright. With a length of 241 in. and width of 124¾ in., its outside turning radius is 231 in. Wheelbase is 155 in. Weight is 47,000 lb.

Circle 130 on postcard for more data

BAKER-RAULANG CO.

LIGHTER-DUTY TRUCKS—Shorter turning radius and other extra maneuverability may be gained in applications where the operating conditions are not too severe, with a new series of electric fork trucks. Two models are now available—the FTA-50 with 5000-lb capacity, and the FTA-70 with 7000-lb capacity. Other capacities will be added to the line. The trucks are recommended by the company for normal and light-duty applications, where the added expense, weight and size of a heavy-duty truck are not necessary unless such severe operating conditions as rough surfaces or steep ramps are present. Under normal conditions the FTA series offers trucks capable of handling capacity loads, with ability to turn in a shorter radius and operate in narrower aisles than heavy-duty trucks of the same capacity.



Baker-Raulang FTA-50, first of a new line of lighter-duty fork lift trucks.

Specifications of the FTA-50 include a 77¾-in. turning radius, 68¾-in. minimum intersecting aisle, 44-in. overall width, and overall length without forks of 79⅝ in. Turning radius of the FTA-70 is 86¾ in., minimum intersecting aisle is 74¾ in., overall length without forks is 89¾ in., and overall width is 44½ in. Standard lift height is 120 in.

Circle 131 on postcard for more data



Clarklift Model Y-350 fork truck for heavy lifting and tiering operations.

AUTOMATIC TRANSPORTATION CO.

OXY-MUFFLER TRUCKS — Dynamotive GLF industrial trucks are equipped with Oxy-Muffler catalytic exhaust purifiers that reduce carbon monoxide in exhaust gases from 70 to 95 per cent.

The muffler is mounted horizontally on the back of the truck's counterweight. Exhaust gases pass through the connecting pipe to a venturi and air inlet. At the venturi the gases mix with fresh filtered air to assist the catalyst in its function. After leaving the venturi the mixture enters the specially designed catalyst chamber, where the catalytic mass reacts on the hot gases, reducing to a safer level the carbon monoxide and organic material content of the exhaust output.

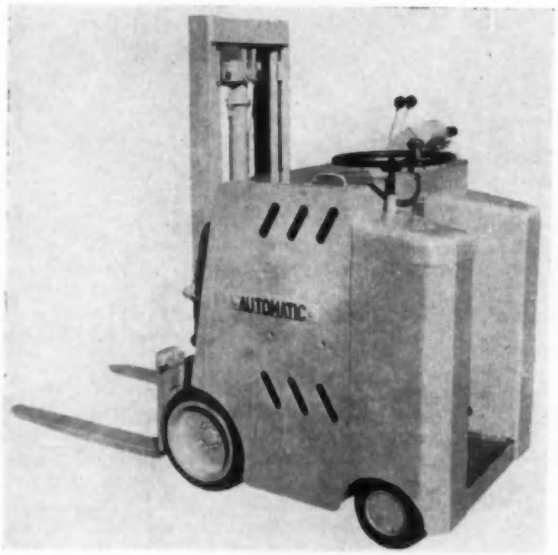
In the catalytic mass is a well containing a sensing thermocouple which

registers on a meter telling the operator how the catalyst is functioning. The material is effective for a minimum of 1000 hours. When the catalyst activity has declined and is no longer reducing the exhaust fumes, it can be replaced on an exchange basis.

The Dynamotive, an electrically-driven, gas-powered fork truck, is built with lifting capacities up to 10,000 lb.

Circle 132 on postcard for more data

AUTOMATIC TRANSPORTATION CO.



LIFT TRUCK — Model FFE-15, illustrated, is new shorter version of the Docker and was designed for operation in extremely close quarters, such as elevators and trailers. Only 47⅝ in. from heel of the forks, it has a turning radius of 49½ in. and will operate in a 50-in. right-angle intersecting aisle. Lifting height is 135 in. with a mast height of 83 in., or 105 in. with a 68-in. mast height. Compactness of this model was made possible by installing higher, narrower batteries.

Circle 133 on postcard for more data

VAC-U-LIFT CO.

VACUUM LIFT SYSTEM — A material handling system called Vac-U-Lift uses induced vacuum in combination with single or multiple Vac-U-Pads for lifting and holding non-porous materials. The system utilizes a power pack which has a rotary pump, controlled by a five-way solenoid valve, for creating vacuum to 28-in. mercury.

The pads are of metal construction in various shapes to fit particular applications. Positive sealing is controlled through a special sealing ring attached to the perimeter of the pad. No load is reportedly imposed on the sealing ring, the Vac-U-Pad coming in direct contact with the material and the seal ring only acting to create the vacuum. Safety is provided by a reserve vacuum system which maintains a grip on the material while lifting, in the event of power failure.

It is said the system has been found to be the solution to the handling of non-porous materials where size, flexing and surface protection are important considerations. Grease, oil or other protective coatings do not impair its efficiency. The system can be used in conjunction with lift trucks, cranes or hoists.

Round Vac-U-Pads are available with ball and socket attachment, ball socket locking type and rigid type from 2¾ to 18-in. diam with lifting capacities from 25 to 1200 lb each. Rectangular pads are obtainable from 5 by 15-in. to 12 by 35-in., with capacities from 275 to 2000 lb each. They are also available in special designs.

Circle 134 on postcard for more data

YALE & TOWNE MFG. CO.

MAGNETIC ATTACHMENT — A magnetic attachment for industrial lift trucks insures fast, safe handling of metal plate. The attachment, mounted between the forks of an electric truck, operates automatically when a control switch on the cowl of the truck is placed in the "on" position. Turning the switch "off" permits regular fork handling with the lift truck.

The magnet between the forks becomes energized (the switch being on) as soon as the load depresses a bar switch located in the middle of the magnetic plate. This action also lights a small light on the cowl showing the operator that the magnet is in operation.

As a safety precaution, the forks on the truck are pivoted at their base. A tension spring at the top of the forks holds them in a straight upright position when empty, while the weight of a properly-placed load moves the fork backs forward slightly against a pair of stops. If a load is not placed properly on the forks, one of them will not move forward. When this happens, the hoist mechanism of the truck will operate, but the truck cannot be moved in either forward or reverse.

Upon placement of the load, the magnet is de-energized automatically by the action of the fork backs, which are pulled to the rear by their springs as soon as contact with the load is broken.

There is a demag button centered with the on-off switch and the signal light on the truck cowl. This is for emergency use to over-ride the action



Yale & Towne magnetic attachment for electric industrial lift trucks improves efficiency of handling metal plate

of the magnetic attachment in case of unusual circumstances where an operator might encounter an inoperable situation with an improperly-placed, partially-raised load.

Circle 135 on postcard for more data

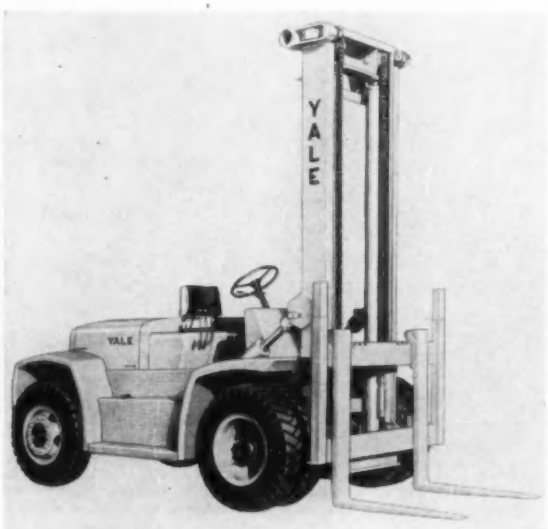
YALE & TOWNE MFG. CO.

LIFT TRUCK SERIES—An all-new line of 15,000- to 20,000-lb capacity, pneumatic-tire lift trucks is called the G-3 series. Features include improved operator visibility and load stability, and fast cyclic rate of operation. The line is being introduced in 15,000-, 16,500-, 18,000- and 20,000-lb capacity models, powered with gasoline or LP-gas engines.

The trucks have lifting speeds of 65 fpm, accomplished with a dual hydraulic pump. Lowering speeds, both loaded and unloaded, are said to be as rapid as possible consistent with safe operation. Travel speeds up to 20 mph are possible. Maneuverability is also featured, the hydraulically-actuated power steering arrangement turning the steer wheels through a 75-deg angular movement.

With fluid coupling, the truck is powered by a Chrysler V-8 industrial engine which develops 105 hp at 2800 rpm. With friction clutch, a Ford V-8 industrial engine of equal output is used. Both combinations have four speeds forward and reverse. Final drive is through hypoid gears and full-floating axles. Brakes are vacuum-powered hydraulic, the system including a reserve vacuum supply.

Circle 136 on postcard for more data

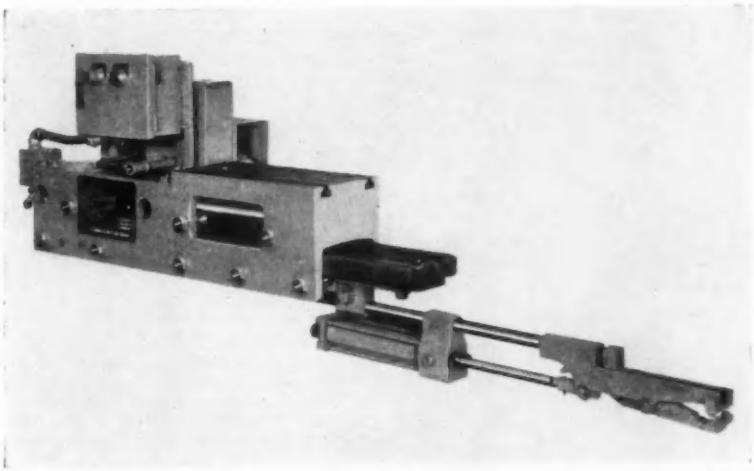


Yale G-3 series lift truck, one of the models in a new line comprising four capacities of 15,000, 16,500, 18,000 and 20,000 lb. Design features include accessibility of components for maintenance ease of operation, improved operator visibility, load stability, and fast cyclic rate of operation.

SESCO, INC.

PRESS UNLOADERS—One line of pressroom equipment has been expanded to include an entirely new series of automatic press unloaders. Each unloader is a fully self-contained unit, except for the limit switch. No floor structure is required; the assembly is contained in a casting and mounted on the press.

The unloader is synchronized with the press through a limit switch, and is operated by two air cylinders—a main cylinder, or lift cylinder, and a jaw cylinder for opening and closing the jaws. When the press signals that it is clear for unloading, the jaw cylinder moves the open jaw forward. At the end of the forward stroke, the jaw grips the part. At this point the main cylinder retracts, lifts the stamping out of the die, and swings it clear of the press. The jaw cylinder then retracts, unclamps the part on a table or conveyor, and trips the limit switch. The main cylinder then returns to its normal waiting position.



The Sesco press unloader unit shown has a main cylinder stroke of 12-in. Through a double rack and pinion, this stroke is doubled, resulting in a 24-in. traverse. The iron jaw cylinder has a stroke of 8-in., and clamps the part by a mechanical cam, actuated at the extended position of the piston rod.

The unloaders are available in five standard sizes to meet most unloading conditions. Jaw widths are adjustable for different width parts; and jaws are adjustable for different loading heights and for the angle of travel into the die. Parts can be swung out varying distances depending upon the method of mounting and the length of the arm. Special units can be built to serve unusual situations.

Circle 137 on postcard for more data

BARRETT-CRAVENS CO.

OPERATORLESS TRACTOR — The manufacturer of the Guide-O-Matic electronic industrial tractor has developed a new optical guidance system which requires only a painted line or a white tape on the floor to transmit guidance to the tractor. Light emanating from a small, low-powered bulb in the sniffer box reflects from the white tape or paint and actuates photo-electric cells in the box to steer the tractor in the direction of the line.

Circle 138 on postcard for more data

AUTOMATION AND MATERIAL HANDLING EQUIPMENT

HAPMAN CONVEYORS, INC.

HEAVY-DUTY CONVEYOR — For conveying heavy items such as spiral metal turnings, stampings, castings, forgings, etc., the new Pan-Link conveyor is said to be of unusually simple construction. The conveyor housing is a girderlike box section, with two pairs of longitudinal rails on which the loaded and return apron rolls. Rails also reinforce the housing, reducing the need for exterior support. Modular conveyor sections are built in standard 10 ft lengths for assembly



Hapman Pan-Link conveyor

to any length required. Apron design is flexible, permitting conveyors with one drive unit to operate horizontally, with ascending or descending sections.

Circle 139 on postcard for more data

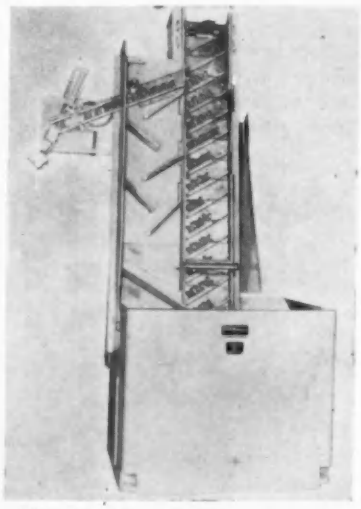
CROWN CONTROLS CO., INC.

DIE-HANDLING LIFT — A manually-operated hydraulic lift designed to simplify the handling of dies and similar loads. Available in 500 and 1000-lb capacities, the E-Z lift has a special die-handling table fitted with six easy-turning full-width rollers. The front of the table has an adjustable steel retainer to safely keep the die on the lift during moving.

Features of the lift are stated to also include an easy-to-operate hydraulic lifting mechanism, automatic protection against overloads, safety guards, and short turning radius for maneuverability. Its lifting range is 7 in. to 57 in. above the floor. Modifications to the basic designs are obtainable to meet special applications.

Circle 140 on postcard for more data

FEEDALL, INC.



GRINDER FEED UNIT—This unit was designed to automatically feed universal joint spiders to a centerless grinder where four diameters are ground in one operation. The parts are placed in the nine cubic foot hopper, from which they are taken by the elevating conveyor to the delivery chute and then, oriented, delivered to the grinder.

Circle 141 on postcard for more data

HARRY J. FERGUSON CO.

CONVEYOR DEVICE — For light-duty applications on converging conveyor lines, a device has recently been developed to automatically keep material flowing from only one of two lines at a time, thereby avoiding jam-ups. Called the Fergo-Merger Jr., it is said to be suitable for controlling the flow of material weighing 20 lb or less.

The unit gives the right-of-way to the package which reaches the intersection first, holding back the other line until the first package has cleared.

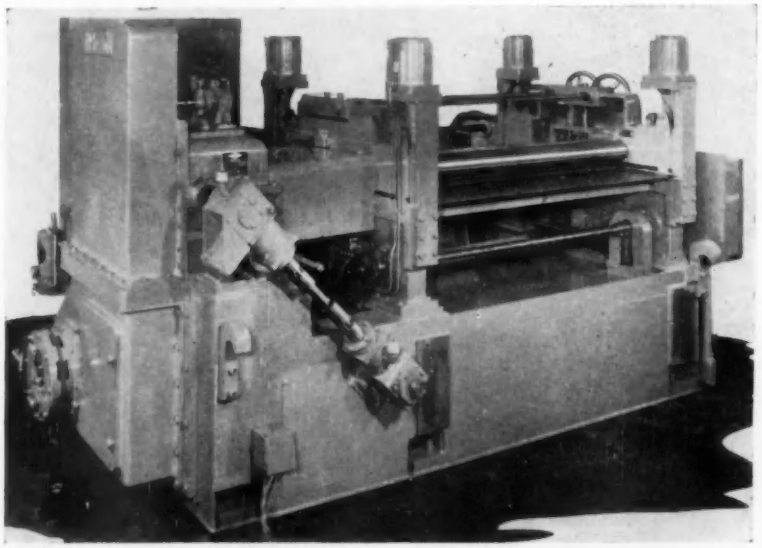
Circle 142 on postcard for more data

McKAY MACHINE CO.

AUTOMATIC FEED LINE FOR PRESSES—Applicable to both progressive die presses and straight blanking presses, a new mechanically-controlled, completely automatic feed line is designed to feed lengths as long as 60-in. of 0.125-in. by 60-in. wide stock. Composed of a coil holder, a decoiling unit, a mechanically-controlled feeder unit, and, in cases where a scrap skeleton must be disposed of, a scrap shear, the line is electrically synchronized with the press.

For progressive die stamping, the feeder unit has a built-in roll release and anti-backup rolls. All rolls in the feeder unit are driven from a heavy-duty gear transmission through universal joint coupling bars. Strip flatness can be controlled by adjusting the built-in roller leveler; and a slight up-curl can be rolled in to prevent hanging up of the stock in the dies. When needed, the scrap shear is placed on the exit side of the press with entry feed rolls synchronized mechanically with the feeder.

Circle 143 on postcard for more data



McKay mechanically-controlled measuring and feeding unit, part of an automatic decoiling, measuring and feeding line which can handle stock 0.125-in. thick by 60-in. wide and feed lengths up to 60-in.

AI

AUTOMOTIVE INDUSTRIES

Quality Control Section

BALANCERS

GAGES

GEAR CHECKERS

HARDNESS TESTERS

MAGNETIC INSPECTION

OPTICAL TESTERS

MACHINE TOOL AND PRODUCTION EQUIPMENT

QUALITY CONTROL EQUIPMENT

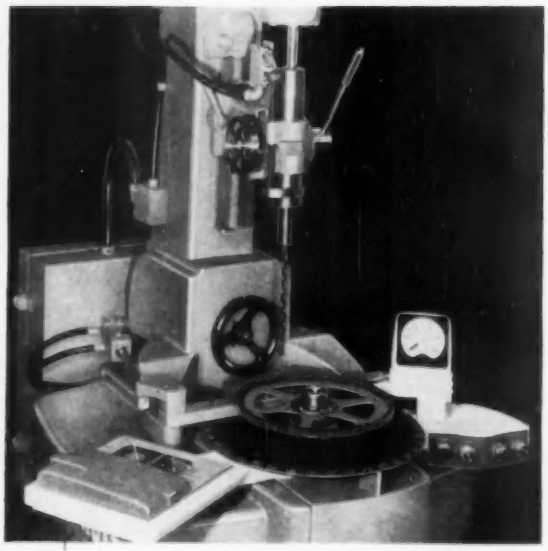
FOR ADDITIONAL INFORMATION
please use reply card on PAGE 183

GISHOLT MACHINE CO.

VERTICAL BALANCER—The arrangement on a Gisholt 1SV1 vertical balancer shown here, permits high production balancing operations on large diameter, narrow width parts requiring correction for unbalance in a single plane. The workpiece, an automatic transmission flywheel, is placed on a special adapter and rotated along with a horizontal disc which has numbers around the outside edge. The direct reading amount meter and strobe light which indicates the angle of unbalance, are mounted in one housing, permitting the operator to observe the angle and amount of unbalance simultaneously in the same visual field. The numbers on the outside edge of the horizontal disk pass under the strobe light which flashes once, each time around, showing the exact angular location of the unbalance. At the same time the amount of unbalance is shown on the amount meter which is calibrated so that each mark equals 1/32 in. drill depth of the ½ in. drill which is to be used to make the unbalance correction.

When the readings have been completed, the operator stops rotation and positions the workpiece under the correction drilling unit at the angle previously noted. He then lowers the drill, which in turn actuates an air-operated thrust device (visible on the left of the workpiece) to support the workpiece during the correction drilling operation. The operator lowers the drill until the reading on the depth dial to the left of the handle in the upper portion of the illustration matches that observed on the direct reading amount meter. Then the work is rotated again to check the job. Unbalance is usually corrected by drilling three holes or less, promoting the production of 77 parts per hour at 80 per cent efficiency.

Circle 155 on postcard for more data



General view of Gisholt 1SV1 balancer. Note the workpiece on adapter and integral correction equipment. Setup permits measuring unbalance, correcting and inspecting in one handling.

ALLEGHENY LUDLUM STEEL CORP.

PORE STRUCTURE GAGE—This instrument, called the Porosimeter, serves to test the pore structure of various materials. It measures the sizes of pores in materials with pores ranging from 0.1 mm to 0.06 microns, and determines pore volumes as small as 0.0005 milliliters at each pore diameter. It can determine the quality and performance of filters or battery separator plates through a pore-structure analysis of the parts. Metals, fuels, plastics, chemicals, and ceramics may thus be tested.



Porosimeter pore-structure instrument

The instrument works on the principle that mercury will penetrate the pores of any porous material if sufficient pressure is applied. Initially an experiment is run by placing a small sample piece of the material to be tested within a glass enclosure. Only pressures below atmospheric are used to force mercury into the pores while the sample is kept in this location.

To measure smallest-sized pores, the sample is moved to a vertically-sliding, stainless steel pressure vessel. Here, pressures up to 3000 psi are applied to the sample. Pressure is fed to the testing vessel through a series of stainless steel tubes. As pressure is raised, mercury is forced into smaller and smaller pores, the volumes of which are continually being indicated by the mercury level as it drops in the container.

Circle 156 on postcard for more data

WILSON MECHANICAL INSTRUMENT DIV., AMERICAN CHAIN & CABLE CO.

HARDNESS TESTER — A Model Y motorized, semi-automatic, high-capacity hardness tester has a short test cycle to permit an increased number of Rockwell readings to be taken and recorded within a definite time period.

This instrument has an illuminated dial gage, identer light and the Set-O-Matic dial gage. With this latter gage, it is no longer necessary to set the large hardness indicator pointer to zero manually because the pointer will automatically return to zero when a minor load is applied. Motorization feature allows the removal of the major load in the test cycle. The cycle of major load operation may be adjusted to less than two seconds and application is controlled through a dashpot, which gives variable speed control if desired. Power is supplied to the unit from a 110-v, 60-cycle, single phase a-c line.

Circle 157 on postcard for more data

MAICO CO., INC.

SPEED-FEED METER—Measuring and indicating linear rates of travel and rpm, the MF-2 speed-feed meter is said to be particularly useful with lathes, boring machines, milling machines and other equipment where accurate feeds must be maintained.

The feed rate pickup converts linear motion into an electrical signal. A large illuminated meter gives the reading directly, with pushbutton selection of four scale ranges from 0-1 to 0-125 ipm. Models are also available with combinations of feed rate and rpm scales. The tachometer pickup has no moving parts. A hand-held tachometer pickup is another accessory item.

Circle 154 on postcard for more data

P. A. STURTEVANT CO.

OPTICAL TORQUE TESTER—A wide-range power-operated optical tester capable of accurately testing all types of torque wrenches. Wrench types include direct reading, reflex signaling, complete releasing, bending beam, rigid frame, solid handle, pivoted handle, ball handle and tee handle. Provision is also made on the metal cabinet of the tester to permit the mounting of special external fixtures for miscellaneous production and laboratory tests, such as the test of a sensitive clutch mechanism. The addition of a power-operated mechanism enables the checking and setting of mechanical time fuses. With a simple fixture the equipment also lends itself to the recalibrating of strain-gage devices. Another adapter is available for recalibrating cable tensiometers.

The tester features a torsional shaft measuring element that is submerged in preheated oil which enables constant operating temperatures for the measuring device. There is no mechanical connection between the measuring element and the indicating pointer, as the pointer is projected onto the scale through an optical system. The indicating pointer, as it appears on the television-type screen, travels across a ribbon scale for a distance in excess of 10 ft in total length.

Another feature of the tester is that it is equipped with a power loading device. A torque wrench can be tested to full capacity in seconds, or may be checked quickly over each increment marking on the full scale range of the wrench. The loading arm is operated by an air-draulic system, and movement of the arm can be controlled with a metering valve so that it will move as slowly or as rapidly as desired.



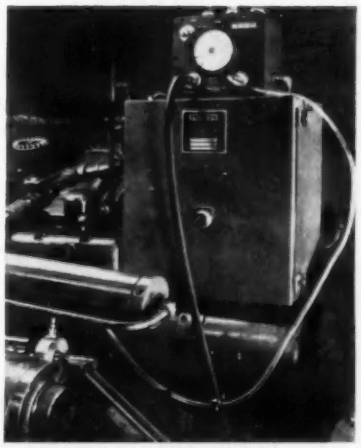
Sturtevant optical torque tester

The tester is available in three models. The OTT 250-I has two range scales of 0 to 250 lb-in. and 0 to 4000 oz-in. On the OTT 165, range scales are 0 to 165 lb-ft and 0 to 1980 lb-in. The OTT 500 range scales are respectively 0 to 500 lb-ft and 0 to 6000 lb-in.

Circle 158 on postcard for more data

FEDERAL PRODUCTS CORP.

MEASURING GAGE — Known as Series 493-CG, continuous measuring gage for centerless grinders measures the output and visually indicates any trend toward out-of-tolerance work, thus permitting as many as three or four machines to be adequately supervised by a single operator. In order that the gage will respond to work-piece size only, ignoring local irregularities such as spaces between work-pieces, oil holes, and annular grooves, it incorporates a time delay response which is adjustable in accordance with the speed of work travel and piece length. This time delay provision produces a steady, uninterrupted signal which indicates the condition of the work. It does not interfere with detection of trend toward borderline work size. Large lights on top of the meter-switch unit provide this indication.



Federal 493-CG continuous measuring gage for centerless grinders

Indicating limits can be set within the spread of the tolerance so that the operator will be signalled before any oversize or undersize work is produced. The indicating dial is graduated in 0.000050 in. and the air-electric system used in the gage permits indicating limits to operate within plus and minus five millionths of their established settings.

The gage is comprised of standardized components and is normally supplied with an air snap gaging head which can be equipped with various size spacing blocks to suit a variety of work sizes. Alternately, it can be equipped with an air ring gaging head, as shown in the illustration. Both types of heads provide non-contact measurement which places no drag upon the work.

Circle 159 on postcard for more data

(*Turn to page* 162, *please*)

3 WAYS YOU CAN KEEP

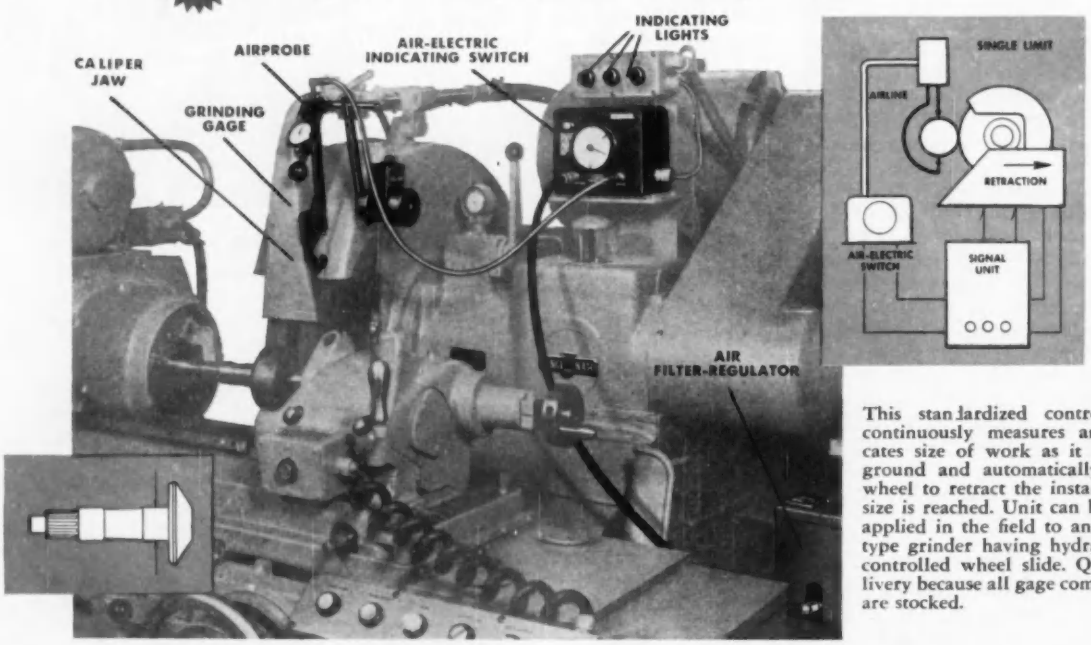
A BETTER PRODUCT . . . AT LESS COST . . . THROUGH ADVANCED GAGING . . . . . .

Profit margins aren't getting any better . . . just the opposite. With buying appetites fairly well satisfied, it's no longer a matter of "getting the stuff out". The problem now is making it *better at lower cost.* You certainly don't plan to let competition catch up to you. So consider these ways of improving product quality and, at the same time, cutting down on the cost per piece. Advanced gaging — by FEDERAL — can do it. The gaging ideas are proven profit makers. The gages, far from being monsters of automation, are compact, standardized units, realistically designed to provide automatic control or inspection, or both, where it does the most good and at a price that practically *every* manufacturer can afford. And they have reliability . . . the most important single feature of FEDERAL Gaging.

Whether you're big or small in terms of production, ***at least one of these gaging arrangements can pay off for you.*** *It's the truth. Ask us to prove it. Write:*

FEDERAL PRODUCTS CORPORATION
7269 Eddy Street, Providence 1, R. I.

1 AUTOMATIC CONTROL OF FINISH SIZE



This standardized control gage continuously measures and indicates size of work as it is being ground and automatically causes wheel to retract the instant finish size is reached. Unit can be easily applied in the field to any center type grinder having hydraulically controlled wheel slide. Quick delivery because all gage components are stocked.

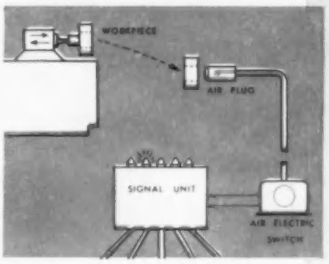
BENEFITS: *Reduces cost of operation — permits one operator to handle two, possibly three grinders performing the same or different operations. In this way gages pay for themselves within a few months.*

Improves quality — even if you have only one grinder, gage is a profit-maker because it eliminates error due to operator inattention or fatigue and also eliminates cost of later inspection. Gage never tires, is accurate to .0001" or better, is easily adjustable to control different sizes of work. Its Air-Electric system overlooks minor workpiece surface irregularities which confuse size readings of other gages.

VARIATIONS: *Similar FEDERAL Gages are available through machine tool manufacturers to also change wheel feed rate to dwell grind . . . or to control dressing cycle and finish size on I.D. grinders. When specifying machine tool requirements be sure to include* FEDERAL *Gaging.* FEDERAL *maintains close engineering alliance with all leading machine tool manufacturers.*

AHEAD OF COMPETITION

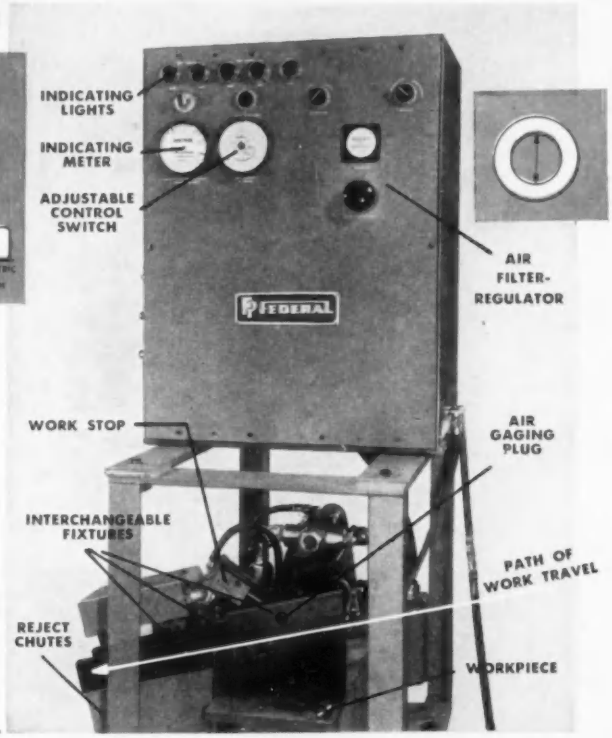
2 AUTOMATIC 100% INSPECTION

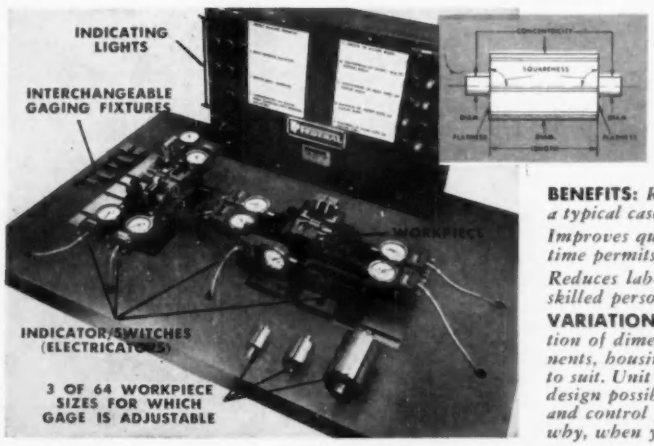


This standardized "post-process" gage inspects every part as it is discharged from the machine and sorts work into "good", "near-over", "near-under" plus "salvage" and "scrap", indicating the size of each piece as it is gaged. Operator, watching large indicating lights, can compensate machine for drift and piece-to-piece variation *before any scrap parts are produced.* Unit can be applied to any type I.D. or O.D. grinder, lathe, boring machine or screw machine. Gaging fixtures can be made interchangeable to handle various work sizes.

BENEFITS: *Lower cost per part. Gage virtually eliminates scrap by showing trend before tolerance limits are reached. Eliminates inspection errors — gage has 99.8% reliability or better as compared to about 92% for operator inspection and about 85% for inspection by other personnel.*

VARIATIONS: FEDERAL *Gages of similar type are available through machine tool manufacturers to also provide automatic compensation of the machine, either proportionally or by increments, so that drift is corrected without need for operator attention. Moral: To get the maximum return for your investment, be sure to specify* FEDERAL *Gaging when you're buying machine tools.*





3 SEMI-AUTOMATIC, MULTIPLE DIMENSION MEASUREMENT

Ideal for small and medium production manufacturers, this gage checks nine dimensions in two stations and is adjustable for 64 different sizes! Work is loaded and disposed of manually. Lights show "good", "over" and "under". Units like this one have paid for themselves in well under six months.

BENEFITS: *Reduces non-productive costs — inspection time per part, in a typical case, is reduced 75%.*

Improves quality level. Inspection error is eliminated. Greatly reduced time permits profitable 100% inspection instead of sampling.

Reduces labor cost. Inspection can be performed satisfactorily by less skilled personnel.

VARIATIONS: *Unit can be designed to provide virtually any combination of dimensional measurements. Sensing elements, electrical components, housing and base are standardized. Other components designed to suit. Unit can incorporate semi-automatic disposal. Number of other design possibilities all the way up to a completely automated inspection and control gage. In every design the emphasis is on reliability. That's why, when you buy* FEDERAL *Gaging, you buy results.*

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

Continued from Page 159

OMER E. ROBBINS CO.

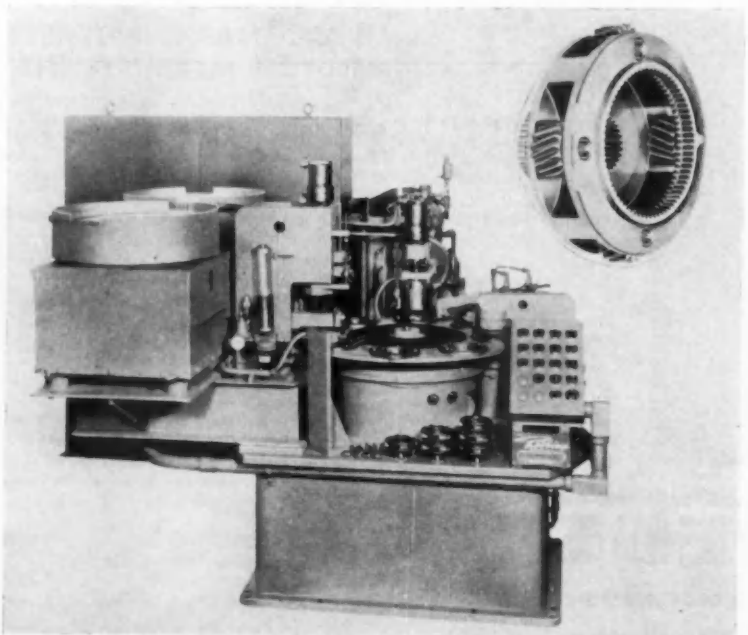
EIGHT-STATION AUTOMATIC ASSEMBLY MACHINE—Can process and inspect 720 assemblies per hour at 100 per cent efficiency. Performs multiple operations automatically, including press-fit inspection, on automatic transmission assemblies.

Four pinions, with needle bearings and spacers for each, are previously assembled into the gear carrier and held in place with dummy pins. These assemblies are manually loaded into the machine. At the first station permanent pins are fed from two vibratory hoppers, shuttled into position, and pressed into the assembly, forcing out the dummy pins. The next station checks the press fit of each pin, automatically informing a built-in memory circuit in the electrical system if a pin does not resist a predetermined pressure. This memory circuit causes defective assemblies to be ejected automatically at the next station. Acceptable assemblies continue without interference through this station to the next where the pins are staked at each end to make a permanent assembly.

Fixtures float freely over the index table and ride up on stationary anvils at the operating stations, thus eliminating pressure on the index table. Positive alignment is assured at each station by hardened locating pins, which pick up locating bushings in the fixtures. In addition to automatic and manual "start" and "stop" buttons, the control panel has buttons which control individual machine movements, as well as offering forward and backward inching control of the table. A red light on the panel flashes whenever an assembly is rejected.

All stations on the machine are hydraulically-operated and have electrical interlock. Hydraulic and electrical equipment conform to JIC standards.

Circle 160 on postcard for more data

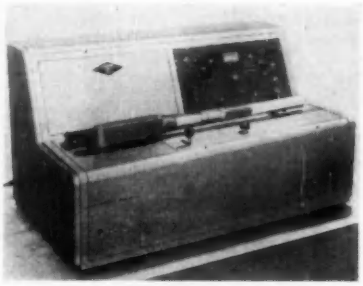


Robbins eight-station automatic assembly machine processes automatic transmission gear carrier assemblies at the rate of 720 per hour at 100 per cent efficiency

BALDWIN-LIMA-HAMILTON CORP.

TORQUE WRENCH TESTER—Torque wrench calibration has been simplified and made more accurate with this tester wherein torque is measured electrically by means of special SR-4 resistance wire strain gage type torque transducers. The tester was designed for checking torque wrenches used on aircraft. Other devices can be calibrated with minor modification of the tester.

The torque measuring system consists of an electronic amplifier and an indicating instrument with rotating dial on which torque can be read in lb-in.: one lb-in. per division up to 2040 lb-in., and five lb-in. per division up to 6200 lb-in. The low range is provided in five steps of 440 divisions each, and the high range in three steps of 440 divisions each. Separate torque pick-ups are used for the two ranges. Loads are applied on the handles of torque wrenches hydraulically through an adjustable fulcrum, and the tester is powered by plugging into a 115-v. 60-cycle line. Pick-up cells are provided with hex, square, and special adapters in sizes to meet various requirements.



Baldwin SR-4 torque wrench tester

Operating controls include a loading knob, range selecter switch, and load step switch to utilize the 440-division indicator scale on different sections of the full scales to 2040 and 6200 lb-in. The tester itself can be calibrated readily by means of a calibration arm and dead weights. It is 40 in. long 24 in. deep and 18 in. high overall. Total weight is 300 lb.

Circle 161 on postcard for more data

LINDBERG ENGINEERING CO.

PILOT PLANT FURNACES—These furnaces are especially designed for pilot plant operations requiring the testing and determination of methods and processes for heat treating and melting of metals. With this equipment manufacturers can set up practical and controllable procedures for determining individual requirements for products and parts.

The present line comprises six units as follows: An atmosphere box furnace 6 by 12 by 5-in. for continuous operation at 2600 F; box furnace 5½ by 7½ by 14¼-in. with reactor control; a 3-kw high frequency induction furnace; a horizontal tube furnace; a vertical tube furnace 5-in. OD by 8-in. effective; and a high temperature pot furnace for operation to 2500 F.

Circle 162 on postcard for more data

SHEFFIELD CORP.

RETAINER RING GAGE—Measures thickness and parallelism of half-moon type retaining rings at three places and permits size classification in "tenth" (.0001) increments for selective assembly. Inspection rate is 400 to 500 parts per hour.

The gage consists of a feeding and gaging fixture and a three-column Precisionaire instrument. Mounted on the bench-type base are a vertical stacking tube for holding the rings and a push-pull feed mechanism for sliding the rings individually under three Plunjet gaging cartridges in the gage station. Each Plunjet is connected to its own air column in the instrument.

The operator loads the rings onto the vertical stacking tube and by means of the push-pull feed mechanism slides the rings individually into the gage station. As soon as the ring comes in contact with the three cartridges, the operator glances at the position of the floats in the instrument to see whether or not the ring is within tolerance and size classification. Parallelism is indicated by the relative positions of the three floats.

Circle 163 on postcard for more data

MICHIGAN TOOL CO.

GEAR SPEEDER — Easier and truer noise inspection of larger size mating gears is possible with this modified standard gear speeder. Designated Model 1129-SP, it uses enclosed spindles and a special built-in listening horn for definition of noise characteristics in this particular application. The machine can be provided with fittings for contact microphones and other acoustical equipment.

In operation, only one spindle is driven, with brake loads applied to the opposite spindle. The driven spindle is reversible. Control of the gear speeder is by pushbuttons and manually-operated handles. Four spindle speeds (580, 870, 1160 and 1740 rpm) are obtained from a four-speed constant-torque ¾-hp motor. The external contact friction brakes are manually operated and accommodate a variable load.

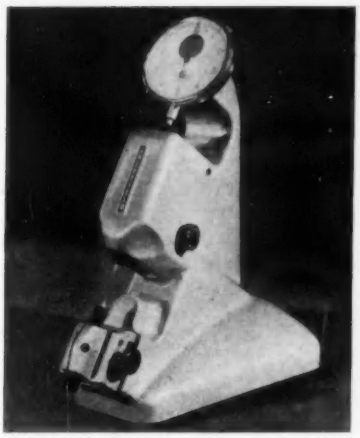
The speeder will accept gears up to a maximum diameter of 23 in. with a maximum face width of 10 in. Center distance range is 2½ to 12 in. Distance between centers on both front and rear spindles is 25 in. Standard fixtures are provided for gears to be tested.

Circle 164 on postcard for more data

SHEFFIELD CORP.

THREAD CHECKER—This gage is capable of checking pitch diameters of any threaded part having external screw threads up to 1½-in. diam and of any specified pitch. The instrument can be operated mechanically to obtain readings shown on a dial graduated in 0.0001-in. Or, for more precise measurement it may be adapted for use with the company's single-column Precisionaire air gage and Plunjet air gaging cartridge, or with the electronic Accutron amplifier and Electrojet pick-up unit.

The device uses one pair of gaging tips for each pitch of thread to be checked. A knob located on the gaging head enables selection of either a 16 or 40-oz gaging pressure; other gaging pressures being available to meet special requirements. Parts are rolled slowly into position between the gaging tips, and pitch diameter variations are read plus or minus from zero on the indicator dial. Setup is made from a master thread plug or a previously-calibrated part.



Sheffield thread checker

Circle 165 on postcard for more data

VAPOR BLAST MFG. CO.

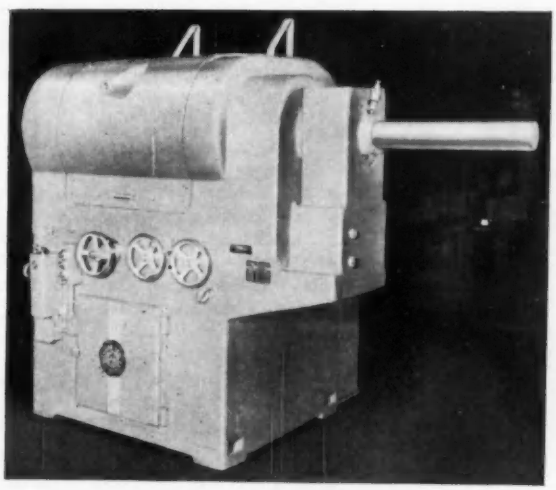
TOOL INSPECTION—As a positive method for detecting cracks and other imperfections in new and reground carbide tools, surface conditioning with liquid honing equipment is being proposed. Liquid honing uses abrasive and hydraulic action to force fine sintered material out of minute cracks or fissures, which then become obvious defects during visual inspection. Because of heat and pressure in grinding, such fissures are normally sealed and hidden by the sintered material, and may not always appear during inspection by other methods.

Liquid honing removes burrs and grind lines, and is said to produce a satin matte finish without dimensional change. Inspection processing can be done at the rate of more than 100 single-point tools per hour.

Circle 166 on postcard for more data

CURTISS-WRIGHT CORP.

FLAW DETECTOR—Designed for the detection of small flaws close to the specimen surface, by ultrasonic echosounding methods, utilizing a high resolving transducer. This transducer can locate a flaw closer to the specimen surface than its quartz counterpart, as well as differentiate between two defects in the same minute area. When a 10 Mc/s,



Michigan Tool Model 1129-SP gear speeder is a modified standard unit designed for definition of noise characteristics in larger size mating gears. The testing unit uses enclosed spindles and a special built-in listening horn. It will check gears up to 23-in. diam.

¾-in. diam transducer is used with a suitable instrument such as the Immerscope, it can detect a round plane flaw only 0.0017 sq in. area at a distance of 0.1 in. below the top surface of an aluminum specimen.

In addition to the line of standard high resolution transducers, the company also offers these transducers modified to meet special requirements. These modifications include: special acoustic matching to the immersion fluid; beam focusing to any reasonable depth; and special shapes, such as a rectangular broad-beam "paint brush" style, for rapid automatic scanning of large surfaces. Broad-beam transducers up to six inches wide have already been delivered.

Circle 167 on postcard for more data

TINIUS OLSEN TESTING MACHINE CO.

BRINELL TESTER — Developed initially for production line of testing of automotive forgings weighing 10 lb apiece, an automatic "go-no-go" Brinell hardness tester accepts or rejects parts at rates up to 1000 per hour. Constructed as a revolving "three-station" tester, it automatically grinds a test surface, applies load, measures depth of impression, and accepts or rejects Brinelled parts without manipulation or judgment by the operator.

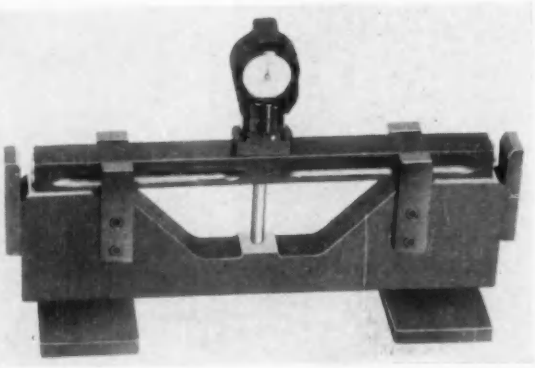
In using this tester, the operator places two parts at a time in the holders on the periphery of the large circular work table, movement of which is controlled by a preset timer. The table automatically rotates a quarter turn to the first or grinding station, where a small smooth area is ground by twin grinding wheels. The parts are then moved to the second station, where a standard Brinell load of 3000 kg is applied on the ground surface. At the same time, the depth of the impression in each of the two parts is measured electrically. Readings are transmitted to the "go-no-go" memory units at the third station. Parts are then picked up individually and either sent to the next operation via a conveyor belt or dropped into the reject pile.

Circle 168 on postcard for more data

HANLO GAGE CO.

UNIVERSAL GAGE UNITS—Featuring full protection of dial indicators, rugged construction and versatility in application, a line of universal gage units gives accurate repeat readings. The unit illustrated, applied as a depth gage, is on a 14-in. central base and stored on a 14-in. master, used for setting the dial indicator.

Circle 169 on postcard for more data



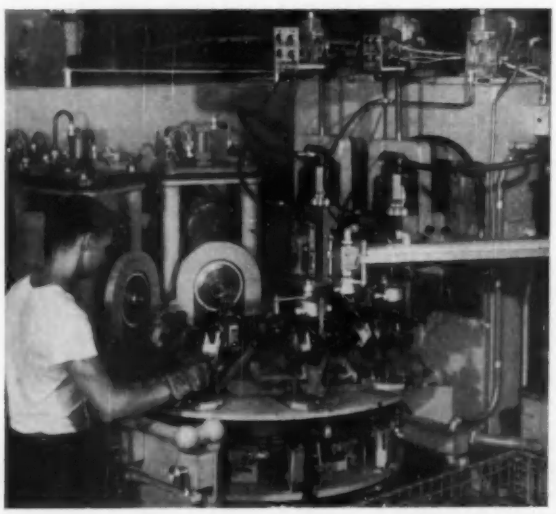
SPERRY PRODUCTS, INC.

BEARING TESTER—Comprising a metal probe connected to an electronic amplifier equipped with calibrated meter, loudspeaker, controls and, if desired, with devices for making permanent records, an instrument has been developed for detecting and measuring wear in bearings, gears, spindles or slides. In addition to being usable in preventive maintenance programs, the device is applicable in production testing of parts and components by showing fluctuations from predetermined acceptable readings.

It operates on the principle that disturbances caused by parts malfunctioning are reflected as noise energy in the supporting bearings. The highly directional probe picks up this transient energy output or friction loss from the relative movements of contacting parts. The noise energy, and changes therein, are shown visually on a meter calibrated from 0 to 100. They are also amplified and fed to a loudspeaker for aural interpretation.

Equipment for making permanent records of results also can be supplied if wanted.

Circle 170 on postcard for more data



Tinius Olsen "go-no-go" Brinell hardness tester automatically accepts or rejects production-line automotive forgings at rates up to 1000 per hour.

MAGNAFLUX CORP.

THICKNESS MEASURER — With improvements and added features for greater accuracy and easier use, a new ultra-sonic thickness measuring instrument called the SO-100 Sonizon is available. It is an instrument which measures thickness from one side and shows readings by a pip on a TV type tube face when the crystal probe is touched to the test surface. By means of thickness determination the unit can detect thin spots in walls of cast, formed, welded or ground objects; laminar defects and laminations; eccentricity in cored castings; and lack of bond between materials, as in bearings, brake shoes, and sandwich constructions.

Features cited which add to its usefulness include small size, light weight (30 lb), and a long search cable which make it adapted for use in constricted areas.

Circle 171 on postcard for more data

AI

AUTOMOTIVE INDUSTRIES

Welding Equipment Section

RESISTANCE

SHIELDED ARC

SHIELDED GAS

CONTROLS

TIMERS

FLUX

MACHINE TOOL AND PRODUCTION EQUIPMENT

HOW MANUFACTURERS CAN SAVE DOLLARS

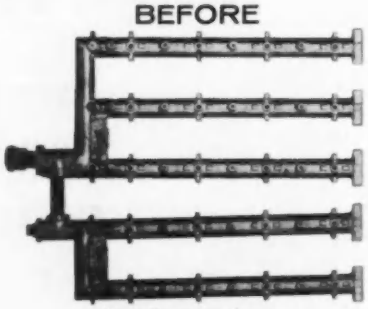


. . . *EASY-FLO brazing cuts costs from design to delivery*

The amount of good you can do your product and yourself by ordering Handy & Harman silver brazing alloys is often best illustrated by dollars and cents figures. Silver brazing with Handy & Harman EASY-FLO and HANDY FLUX proves itself in many ways; its advantages are immediate and significant. The following "brazing benefits" apply to the example illustrated here . . . and easily could apply to your product.

EASY-FLO Brazing: Permits the use of standard materials • Reduces production time (increases production rate) Simplifies manufacturing (cuts down on rejects) • Makes a lighter weight product (easier to handle, cheaper to ship) • Often makes a product stronger and more compact

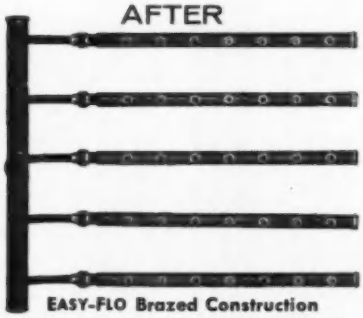
BEFORE



Cast Construction
(Approximate Costs)

Castings Complete	$4.92
Machining	2.76
Total Cost	$7.68
Production Time	1½ hours

AFTER



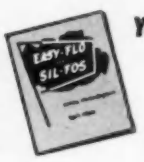
EASY-FLO Brazed Construction
(Approximate Costs—based on 20,000 run.)

Materials	$1.75
Screw Products & Stamping	.45
EASY-FLO Brazing Alloy	.10
Assembling and Brazing	.90
Total Cost	$3.20
Production Time	40 minutes

The gas burner shown here is just one example of how silver brazing can simplify product design and materially reduce production costs. Put *your* product in this picture, the results could be just as beneficial.

TAKE A LOOK

. . . at Bulletin 20. This concise introduction to silver alloy brazing talks about joining methods, as well as joint design and economies that can be enjoyed with EASY-FLO brazing. We'll send you a copy whenever you request it.



Your NO. 1 Source of Supply and Authority on Brazing Alloys

HANDY & HARMAN

General Offices: 82 Fulton St., New York 38, N. Y.

DISTRIBUTORS IN PRINCIPAL CITIES

OFFICES and PLANTS
ATLANTA, GA.
BRIDGEPORT, CONN.
PROVIDENCE, R. I.
CHICAGO, ILL.
CLEVELAND, OHIO
DETROIT, MICH.
LOS ANGELES, CALIF.
OAKLAND, CALIF.
TORONTO, CANADA
MONTREAL, CANADA

WELDING EQUIPMENT

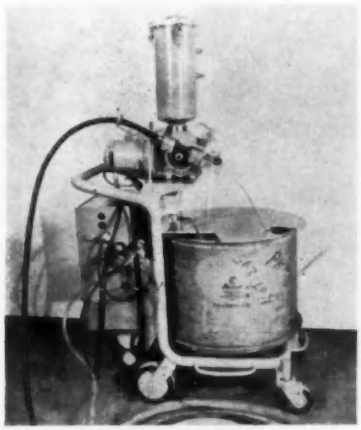
FOR ADDITIONAL INFORMATION
please use reply card on PAGE 183

LINDE CO.

WELDING PROCESS—A semi-automatic metal arc welding process for manual welding of carbon steel has been developed. Known as Unionarc welding, it uses a continuously fed bare wire, powdered magnetic flux, and carbon dioxide gas.

The flux is carried to the welding nozzle by the carbon dioxide gas stream and surrounds the welding wire as it is fed from the contact tip of the torch. When welding current is flowing, a magnetic field is established around the extended portion of the welding wire. The flux is attracted toward the exposed wire and coats it.

As the wire is directed into the weld puddle, the flux melts, refining the



Side view of Unionarc UAM-1 semi-automatic welding machine showing wire supply mounted on rotating assembly

weld metal and shielding it from atmospheric contamination. The carbon dioxide flowing from the torch nozzle also helps to shield the molten metal and the arc.

Welds with this visible-arc process can be made manually in flat, horizontal, vertical, or overhead positions. Welds in carbon steel develop an ultimate tensile strength of 75,000 to 85,000 psi and a yield strength of 65,000 to 70,000 psi.

Direct current reverse polarity is preferred. At present, 3/32-in. diam and 3/64-in. diam welding wires are used. With the former, welding currents are usually between 350 and 450 amp dcrp; while with the latter, welding currents range usually from 125 to 250 amp dcrp. Use of constant potential d.-c. power is preferred generally, although conventional power supply also can be used.

Circle 172 on postcard for more data

PARR PAINT & COLOR CO.

SPOT WELD SEALER—Parweld spot weld elastic sealer compound reduces electrode wear caused by the formation of copper oxide which occurs when the tip comes in contact with ordinary spot weld compounds. Increase of electrode service life by 500 per cent and more is reported by the company.

The compound provides watertight, corrosion-free joints with minimum resistance to the welding current. Satisfactory welds are made with the spot welder set to standard conditions of 10,000 amp, 10 cycles. Tests indicate that more than 850 welds can be made directly through the compound before pitting becomes noticeable. The sealer may air dry up to 96 hours before welding without affecting either weld or sealing quality. The compound will adhere without running or sagging on oiled sheets, and hold its form to temperatures of 350 deg for 45 minutes. It may be applied with conventional pressure compound equipment at 60 psi.

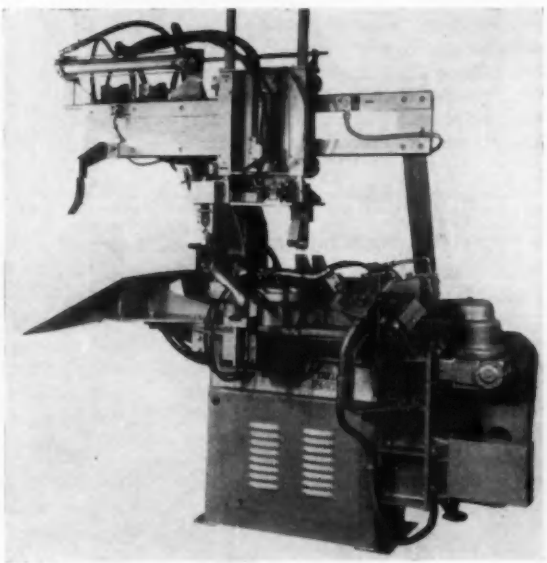
Since the material remains unaffected by bonderizing solutions and hot water, it may be used on production lines where degreasing and bonderizing equipment is used. Spot welded panels sealed with Parweld have shown no corrosion after 100 hour salt spray or high-humidity chamber tests. Recommended procedure is to apply a bead to one faying surface of the joint sufficient so that the compound flows out to the edges as the weld is made.

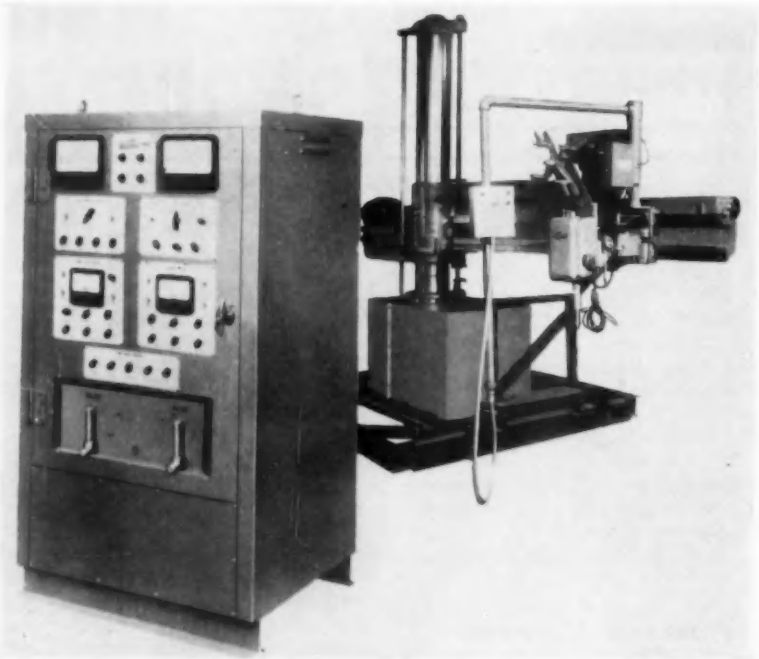
Circle 173 on postcard for more data

TAYLOR-WINFIELD CORP.

FLASH BUTT WELDER—This special flash butt welder joins the ends of curved pipes that form part of an automobile exhaust cross-over assembly. It welds the pieces at the rate of 240 per hour. Upper structure is a pick-up and transfer mechanism for automatic loading. Special tooling includes motor-driven upset and horizontal air clamp. The machine is rated at 75 kva.

Circle 174 on postcard for more data





Weltronic tungsten inert gas fusion welder control

WELTRONIC CO.

WELDER CONTROL—Marketed under the name of Weltronarc, a tungsten inert gas fusion welder control is designed to meet welding requirements encountered in jet engine fabrication and other difficult types of welding. Illustration shows the console in which components of the unit are housed. All electrical apparatus, except the motor, is inter-wired in the cabinet.

Weltronarc parts are designed and built to accurate resistance welder specifications. Electronic timers are used for sequencing. Arc current and arc voltage are controlled within two per cent. Speed regulation of both the wire drive and the carriage drive is held to within less than two per cent. Response time of all regulating circuits is only two cycles.

A high measure of flexibility is said to be a prime feature of the welder control. Variable amplitude and time adjusters operating in voltage regulated circuits afford a wide choice of starting, intermediate, and finishing settings for the current, carriage speed, and wire speed. Stepless electronic control of the arc, from 10 to 400 amp, is also included.

The control can be used with many automatic fusion welding machines, radial welders, special welders, and positioners. Finishing of welds produced by the control is said to be unnecessary.

Circle 175 on postcard for more data

LINCOLN ELECTRIC CO.

WELDER POWER PACK—A power pack attachment for the 500-amp combination a-c and d-c Idealarc welder is designed to permit its use as a power source for the manual Lincolnweld ML-2 semi-automatic submerged arc welder. This combination is intended to make a package capable of manual welding with d-c or a-c current, and submerged arc welding with d-c current.

The Idealarc operates on single-phase input power. Generator power sources for the ML-2 submerged arc unit require three-phase current. The power pack mounts directly on the Idealarc welder and is easily connected.

Circle 176 on postcard for more data

WALL COLMONOY CORP.

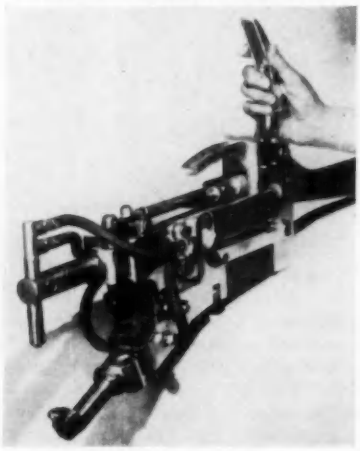
BRAZING FLUX—A new paste type material called Nicrobraz flux has been developed for high temperature brazing of stainless and other high alloy steels. It cleans and promotes wetting of the surfaces to be joined, and helps dissolve oxides during the brazing action. It is said to: (1) contribute to production of better joints on stainless steels and particularly when brazing difficult alloys such as Inconel X and other special alloys containing elements that place them high on the electromotive series; (2) permit high temperature brazing with an oxyacetylene torch and without special atmospheres; (3) allow the use of less expensive atmospheres when furnace brazing stainless steels and high chromium alloys; and (4) permit the brazing of titanium or aluminum bearing stainless alloys in hydrogen atmospheres.

The material has a melting point below 1200 F and is recommended for brazing applications involving temperatures between 1600 and 2200 F. Within the recommended temperature limits, it will not boil or run off. Its cleaning properties enable it to dissolve or remove from stainless steels the oxides of chromium, aluminum and titanium.

The flux is specifically designed for use with Nicrobraz-type brazing alloys in high temperature operations to join high chromium alloys and stainless steels. Nicrobraz flux can also be used for the brazing of carbon steels, chromium iron alloys and copper.

Circle 177 on postcard for more data

ARO SPOT WELDERS DIV., GUTHERY MACHINE TOOL CORP.



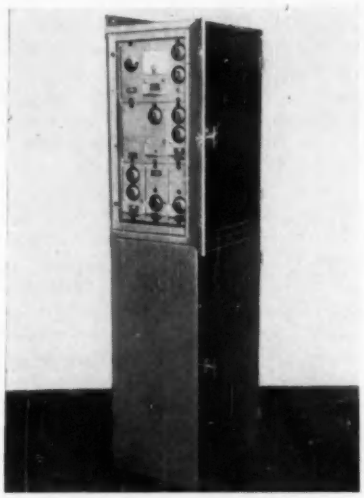
SPOT WELDER—Featuring a convenient lever that lowers and raises the bottom arm for speeding up production, this new Model 192 spot welder also incorporates high welding current for its size, easy one-hand operation, and easily-adjustable spring pressure.

Circle 178 on postcard for more data

GENERAL ELECTRIC CO.

WELDING CONTROL PANELS—Non-synchronous resistance welding control panels, in a complete line, feature unitized plug-in control units, hermetically-sealed relays and other long-life components, and standardized enclosures with swing-out frames. These combine the advantages of electronic control with the benefits of hermetically-sealed relays. The relays provide long life, consistency, and improved overall performance in welding control, while the electronic unit timer eliminates the adverse effects of voltage fluctuations.

The building-block technique of unitized plug-in control units has been employed to obtain maximum flexibility. Engineers say this technique makes possible the building of custom-made panels for any non-synchronous application, as well as panels for standard NEMA combinations. It also provides a simplified method of adding units to existing controls and offers standardized dimensions and appearance of enclosures. The basic unit size is 4 in. wide by 8½ in. high by 8 in. deep. All units have the same height and depth, but vary in width from 4 to 12-in., depending upon space requirements of the individual unit.



A three-tier General Electric non-synchonous resistance welding control enclosure mounted atop an ignitron contactor enclosure

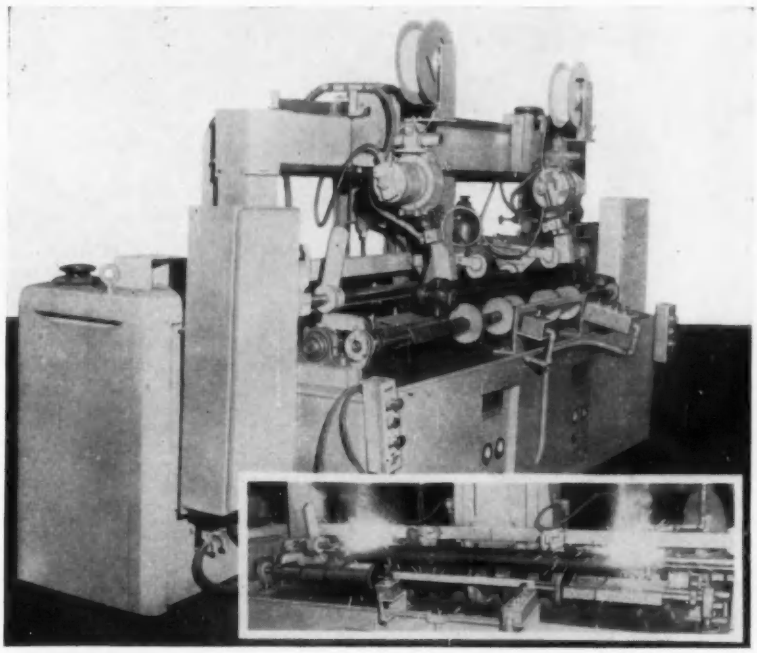
Swing-out frames within the enclosures are featured. These frames, which house the various plug-in control units, can be swung out for easy maintenance and accessibility.

Enclosures for all ignitron contactors, standard or custom timers, and auxiliary controls (such as heat control, current regulators, etc.) have standard base dimensions of 15 in. deep and 20 in. wide. The only variation is in height, which ranges from 12 to 38¾ in. Individual or combination control panels are suitable for wall, floor, or machine mounting. They may be stacked, mounted parallel, or mounted separately.

Access doors are flush with the front and side of the enclosure and are provided with locking-type handles. The swing-out frames are normally mounted so the control dials of plug-in units are accessible through the front door, although frames can be installed to provide side door access.

Each plug-in control unit has been engineered to provide maximum flexibility and accessibility. Industrial printed circuit wiring boards with plug-in terminals are utilized to simplify circuitry.

Circle 180 on postcard for more data



Dixco automatic welding machine for motor truck propeller shafts. Inset shows both ends of one of the longer tubes being welded simultaneously

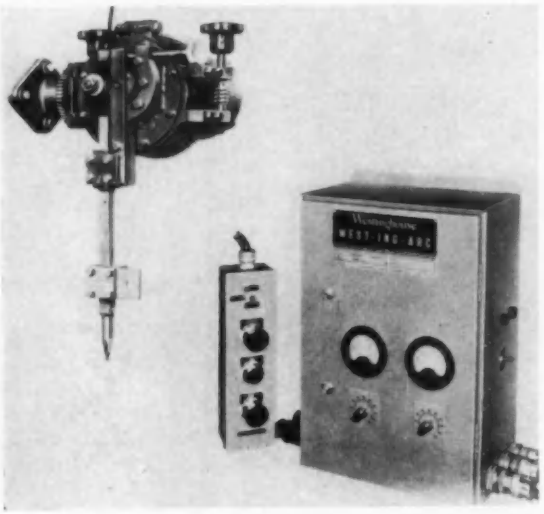
DIX ENGINEERING CO.

AUTOMATIC WELDER — Custom-made for a leading motor truck manufacturer, an automatic CO_2 welding machine recently built produces 190 welded propeller shafts per hour at 80 per cent efficiency. In the course of the machine's operation the universal joint assembly is welded to the drive tube at one end with a continuous weld bead around the diameter. At the same time a splined shaft is welded into the tube at the other end.

Versatility of application is a stated feature of the unit. Tubes handled may vary in diameter and also in length (from two inches to six feet), as may be required for different truck models. A few minor machine adjustments enable the operator to change from a production run of one size to a run of another size of shaft in a matter of minutes.

The machine arc-welds by the gas-shielded method, with bare welding wire fed automatically by a motorized feed mechanism. Direct current supplied to the heads by dual rectifier sets is used to energize the arc, which is surrounded by an envelope of CO_2 gas. The sequences are fully automatic after the operator loads the assembled parts into the holding fixtures. Weld cycle time averages about nine seconds, but varies with the diameter of the tube.

Circle 179 on postcard for more data



Heavy duty welding head, control and operator's remote control station for new West-ing-arc automatic welding equipment.

WESTINGHOUSE ELECTRIC CORP.

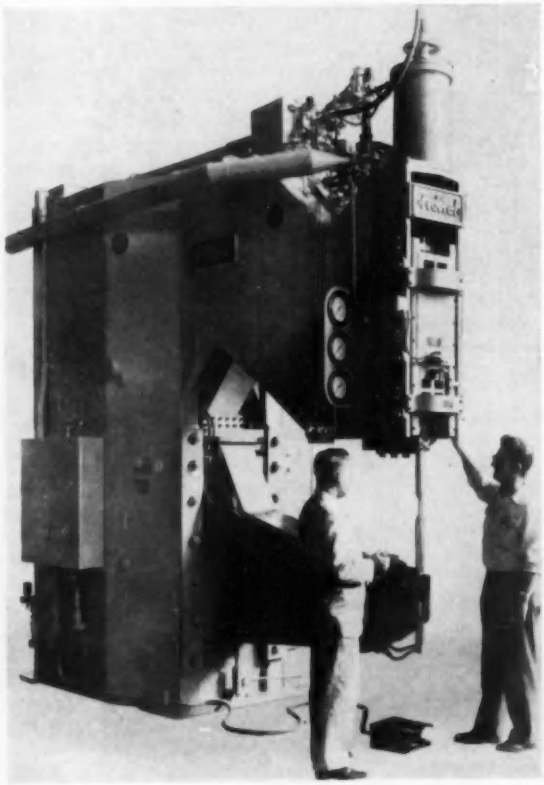
ARC WELDING EQUIPMENT—Two models of West-ing-arc automatic welding equipment are available for CO_2 gas metal-arc or submerged arc d-c welding. Each model consists basically of a heavy-duty welding head, control, operator's remote control station, and interconnecting cables. The equipment provides uniform bead contour and crater elimination at high welding speeds.

As air-cooled units they require no cooling water. Inching of the wire, flux damping, and arc starting are performed automatically with the Model SA-40A, and manually with the Model SA-40. Front-mounted dials permit quick and accurate setting for arc voltage and current. Controls are housed in a NEMA type 12 dust-tight enclosure and conform to JIC standards.

The welding head is capable of driving wire diameters from 5/64 to ¼ in. at speeds up to 300 ipm. The head motor and gear train enclosures mount to form a single cylindrical case mounted on a universal supporting frame. Two manual adjustments permit the head to be rotated 360 deg in two planes.

Circle 182 on postcard for more data

FEDERAL MACHINE AND WELDER CO.



SPOT WELDER — Having a height of over 13½-ft and weighing more than 58,000-lb, the three-phase frequency converter spot welder pictured is said to be the largest resistance spot welding machine of this type built to date. It was designed with a special throat of about 2100 sq in. to accommodate a portion of the tail section of a jet airliner now under construction. The three-phase unipolar transformer, which supplies 100,000-amp of welding current, weighs more than 25,000-lb and reportedly entailed the development of new construction techniques. Features were built into the machine for producing welds meeting specifications exceeding those required by military specifications for aluminum aircraft structures.

Circle 181 on postcard for more data

HANDY & HARMAN

BRAZING ALLOY — Alumibraze is the designation for a new brazing alloy which offers greater flexibility and simplifies techniques for joining aluminum. It is supplied as a dry powder and applied as an aqueous slurry. Designed for use in a molten salt bath, it will join aluminum alloys 2S, 3S, 52S, 54S, 61S, 62S, 63S, 66S, and several types of casting alloys.

The material offers a number of advantages, as follows: (1) The alloy is "painted" on, and thus can be applied conveniently to any surface regardless of its contour. It can therefore be used to braze assemblies where the shape of the parts or location of the joint make it impractical to use preforms or impossible to hand-feed solid brazing alloys. (2) The alloy stays put. It will not flow prematurely and will wet only those surfaces to which it is applied. (3) It is economical to use since, unlike clad-braze sheet, the alloy is placed only where the joint is desired. (4) It provides a convenient way of repairing joints, since in many cases it is impossible to preplace rings or shims accurately on already-brazed assemblies.

The brazing alloy contains its own fluxing material which serves both as a flux and as a cement that keeps the alloy in place during the brazing cycle. When the slurry is dried after application, the flux forms a cement which does not melt at the usual brazing temperatures, but which is soluble in the salt. Thus during the brazing process, the alloy becomes molten, but is held in place until the cement is dissolved. Dissolution of the cement allows the alloy to fill the joint area by capillary flow.

Circle 183 on postcard for more data

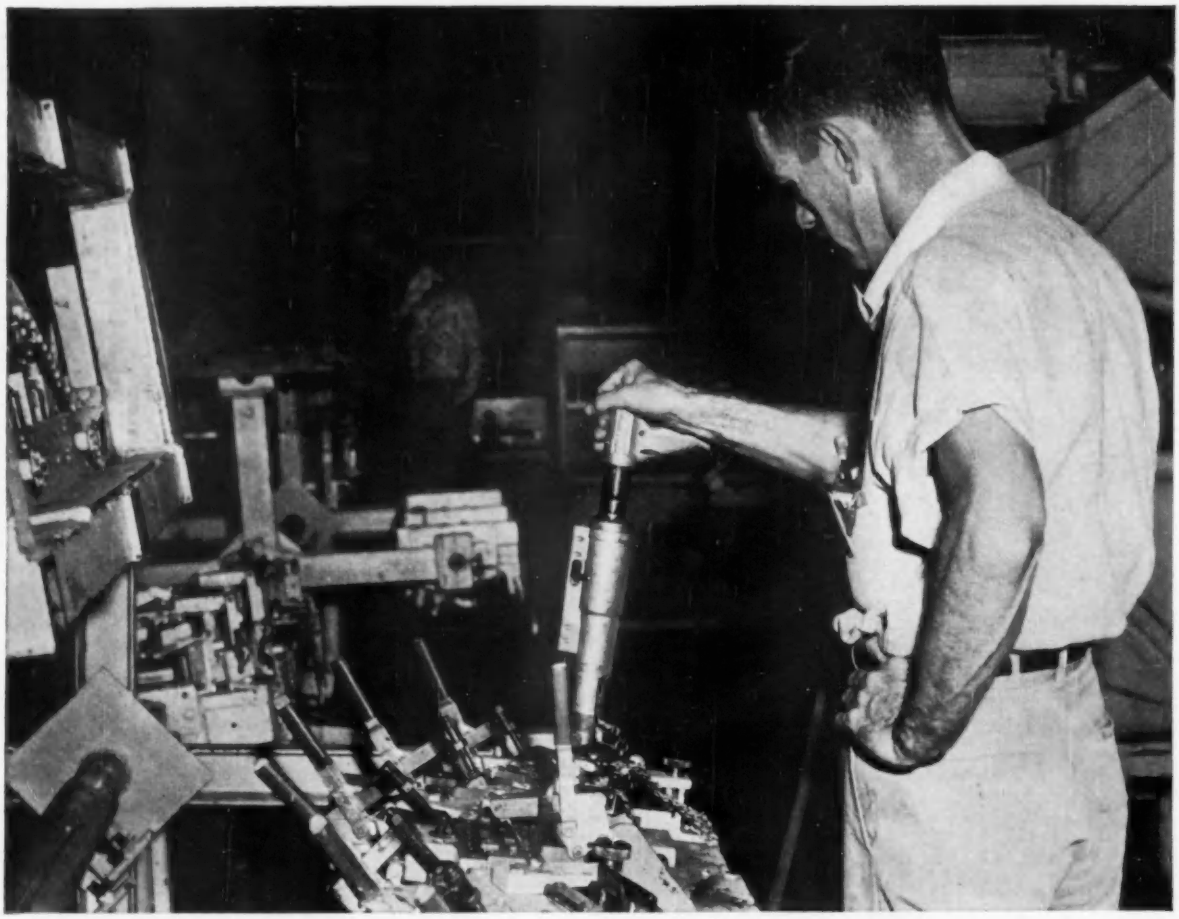
AI

AUTOMOTIVE INDUSTRIES

Specialized Equipment Section

COMPONENTS
CONTROLS
ATTACHMENTS
DRIVES
ELECTRIC MOTORS
NUT RUNNERS
PORTABLE TOOLS

MACHINE TOOL AND PRODUCTION EQUIPMENT



Now drill accurate holes in hard metals easily . . . with the new portable "K-MATIC"*

"K-MATIC" FEATURES

- Develops up to 1000-lb. thrust
- Positive power feed .002" or .003" per revolution
- Simple single-lever operation
- 1¼" stroke length
- Instant automatic bit return
- Adjustable depth stop

This man is standing by while a Keller Tool "K-Matic" portable drilling unit does its work. This new production line drilling unit is only 12" long, weighs less than five pounds; yet it develops up to 1000-lb. thrust, has positive power feed and handles drills up to ⅜".

Thrust is developed against a patented Keller Tool drill bushing tip that is easily locked to a jig by any of several simple methods. Hard metals, soft metals and sandwich construction are drilled so cleanly that reaming is often unnecessary.

Send now for complete information and specifications.

* Trade-Mark



ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

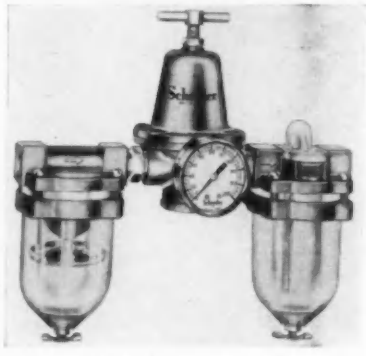
SPECIALIZED EQUIPMENT

FOR ADDITIONAL INFORMATION
please use reply card on PAGE 183

A. SCHRADER'S SON DIV., SCOVILL MFG. CO., INC.

AIR FILTER-LUBRICATOR — Offering low-cost protection for air-operated shop equipment, the Lub-air-ator is a combination of air filter, regulator and lubricator that is automatic in operation and which can be cleaned without removal from the line.

The filter unit has a large area sintered bronze filter, baffle plate and drain cock. The regulator adjusts air flow from 250 psi inlet pressure down to 5 to 125 psi by simply turning the regulator handle. A pressure gage can be mounted front or rear of regulator. The lubricator unit has a vibration-proof adjustment thumb wheel which regulates the oil flow from a steady flow down to intermittent drops.



Schrader Lub-air-ator

The Lub-air-ator is available in three sizes of ¼, ⅜ and ½-in. NP threads. The filter, regulator and lubricator are also available as individual units, or in pairs.

Circle 184 on postcard for more data

CLEARING MACHINE CORP.

PRESS SAFETY DEVICE — A safety device is designed to prevent a press from "repeating" due to failure in any of the press mechanism, where the slide continues to stroke even though the run buttons have not been depressed. Called the Saf-Strok control, it is used in addition to normal operating controls.

The key unit in this safety circuit is a limit switch which is activated if the press crankshaft accidentally goes beyond its normal stopping point. This switch is usually set so that 5 to 10-deg of crankshaft overtravel will actuate the switch and stop the press.

Circle 185 on postcard for more data

STANDARD PRESSED STEEL CO.

ADJUSTABLE SHELVING—A new system of shelving can be erected or altered quickly without the use of tools. Named Hallowell Erectomatic, the shelving has a locking device which holds each shelf firmly in place, while permitting opening for repositioning. In the system, each shelf is supported by two removable steel bars. These supports, which extend the full depth of the shelving frame, are slotted into rectangular holes located on three-inch centers along the vertical frame posts. Pivoted locks are attached to the shelf supports. After a shelf has been positioned in the frame, the locks (one at each shelf corner) are swung into the locking position by thumb and forefinger to engage the lower flange of the shelf.

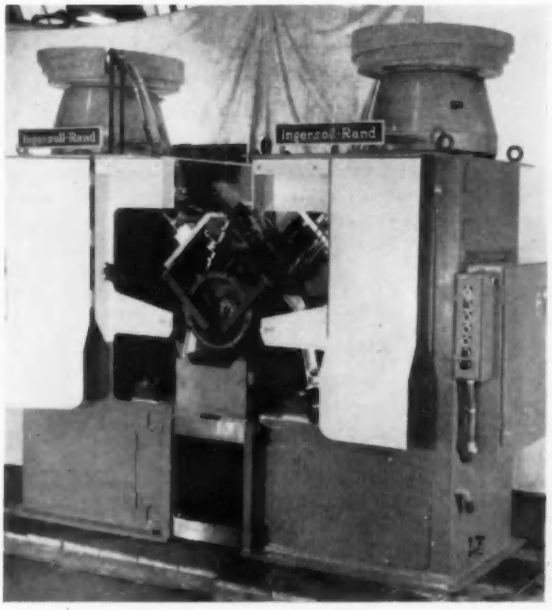
The shelving is available in depths of 12, 18 and 24 in.; widths of 24, 30, 36, 42 and 48 in.; and heights of 39, 51, 63, 75, 87, 99 and 111 in. Accessories are also available, including vertical dividers, back and side enclosures, sliding doors and swinging doors.

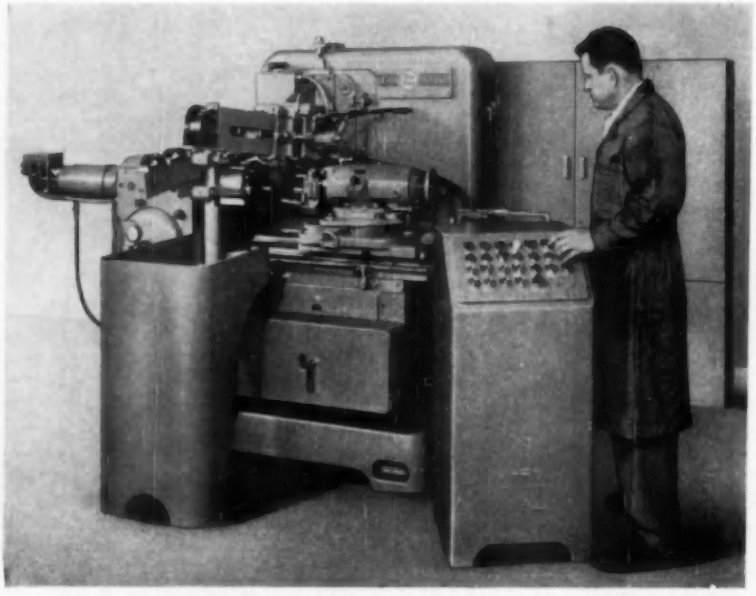
Circle 186 on postcard for more data

INGERSOLL-RAND CO.

ASSEMBLY MACHINE —The unit illustrated is one of four completely automatic assembly machines recently installed to feed and drive connecting rod nuts on final assembly. Used in conjunction with machines that feed the pistons and rods, each of the assembly machines drives four nuts on two connecting rods at the same time. The engines come down the assembly line on pallets, and it is only necessary to index each crankshaft twice. Although the machines are rated at 280 engines per hour, they are being used on an intermittent line at the rate of 100 engines per hour.

Circle 187 on postcard for more data





Red Ring fully automatic loader for internal gears, installed on a Model GCR internal gear tool shaving machine. The loader handles a 75-tooth, 20-pitch, 4-in. pitch diam, 20 deg pressure angle, 18½-deg helix angle internal gear at the rate of 70 gears per hour.

NATIONAL BROACH & MACHINE CO.

GEAR LOADER—Designd for handling spur or helical internal gears on shaving machines, a new fully automatic loading device is said to solve the problem of meshing the teeth in an internal gear with those of the helical gear-shaped shaving cutter. An intermediate air-powered loading sleeve mechanism, which receives the internal gears one-at-a-time from a magazine feed, hangs them on the cutter and provides the meshing problem solution. The loader can be installed on the manufacturer's Model GCR internal shaving machine.

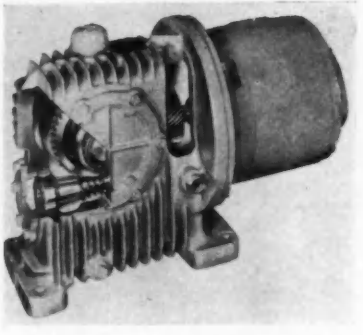
Circle 188 on postcard for more data

CONE-DRIVE GEARS DIV., MICHIGAN TOOL CO.

GEARMOTOR LINE—Compactness, high capacity and long life are featured in a line of right-angle worm gearmotors. They are offered in both standard extended shaft and shaft-mounted models, permitting a wide installation variation. Standard NEMA D-flange motors are used, and gearmotors are available with or without motors as desired. Four different sizes are currently available to handle fractional to 15 hp motors. This range is now being extended to 40 hp.

The units are obtainable in 28 standard output speeds from 6.25 rpm to 525 rpm (which includes all standard AGMA output speeds). These gearmotors are double reduction units with a double-enveloping worm gear secondary and a helical primary.

Circle 190 on postcard for more data



Cutaway of Cone-Drive gearmotor

MANHATTAN RUBBER DIV., RAYBESTOS-MANHATTAN, INC.

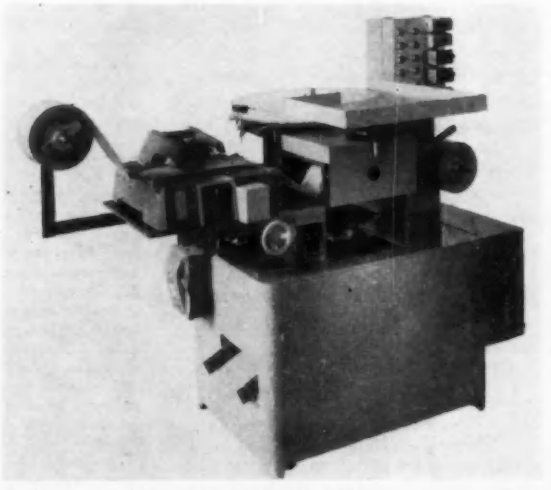
GRINDING WHEEL—Offering high strength and added safety for the operator is a new concept of flared cup wheel construction known as Safety Back. Steel covers the entire back, and extends down the side to give reinforcement.

The Safety Back aids in overcoming abusive wheel mounting and operating practices connected with the use of flared cups. The steel backed threaded steel insert provides convenient and secure mounting, while eliminating the possibility of the hub being pulled out. Ease of operation is also featured. The back covers no more of the wheel than a revolving cup guard, so it cannot interfere with the operator's maneuvering, and doesn't require adjustment as do skirt guards.

Circle 189 on postcard for more data

PAK-RAPID, INC.

PACKAGING MACHINE — Single or multiple items of any shape and size up to 1¼ in. thick may be accommodated in an automatic industrial packaging machine for producing flexible air-evacuated packages. Among the automatic features listed are: pre-printing of packaging materials; pre-counting of completed packages in batch quantities; built-in parts control system; removal of air from within package after package is formed and filled; inspection of package for leakers; safety shut-off for successive rejects; and electronic temperature control.



Circle 191 on postcard for more data

SHAKEPROOF DIV., ILLINOIS TOOL WORKS

SCREW DRIVER — Developed for mass assembly operations, a portable, self-feeding, completely automatic power screw driver called Semspak drives screws automatically at any



Semspak self-feeding screw driver

angle and as fast as the operator can pull the trigger. Each screw is fed into the driving jaws and held tightly in place until started into the workpiece. The operator has full visibility of the driving head, screw and mounting hole.

Circle 192 on postcard for more data



Reliance VSMR variable-speed electronic mill regulator

RELIANCE ELECTRIC & ENGINEERING CO.

MILL REGULATOR — Developed for applications in continuous-process mills, a new dual-circuit variable-speed electronic regulator is designed for drive control on machines requiring high continuity of performance.

Company-developed Sealpaks—special-purpose electronic circuits embedded in blocks of resilient plastic resin—are used throughout the regulator construction, so that all resistor components are protected.

Circle 193 on postcard for more data

GENERAL ELECTRIC CO.

GEAR MOTORS — A new line of integral housepower gear motors and related transmissions has been designed to meet the need for compact and versatile speed reduction. It will be offered in three basic components: an integral-type unit, functionally equivalent to previous designs where gear and drive motor are packaged into a single unit; an all-motor type which features the drive motor coupled to the gear reducer and mounted on a common carrier; and a separate helical speed reducer which may be used with a variety of prime movers.

Mounting dimensions on all three components are identical for similar rating, and parts are interchangeable. The user thus has maximum stock flexibility in back-up parts and units.

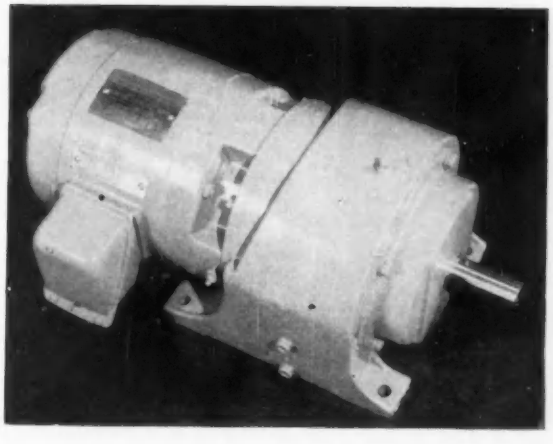
Another new feature is a built-in provision for accomplishing ratio changes through a change of pinion and gear in the first stage only. Means for removing and replacing the pinion and gear are designed into each unit as captive assemblies.

The line will be offered in three basic types of speed reductions: single reduction offset shaft in speed ranges from 780 to 350 rpm; double reduction concentric shaft for speeds from 350 to 37 rpm; and triple reduction concentric shaft for output speeds from 30 to 13.5 rpm.

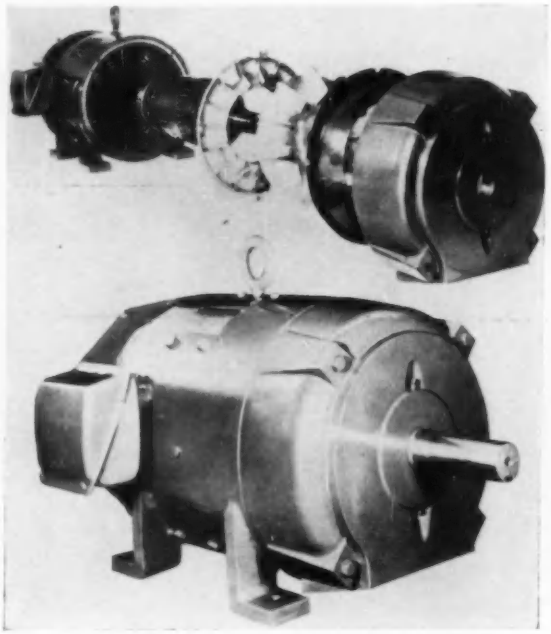
Integral-type gear-motors will be available in the new line from one to 30 hp. The first ratings, up to 10 hp, will be released on Oct. 1. The line will be completed through 30 hp by Feb. 1, 1958.

Separate helical speed reducers and all-motor gear motors will be developed from one to 75 hp by July, 1958. The release of the initial sizes will coincide with the release of the corresponding gear motor ratings.

Circle 194 on postcard for more data



Overall view of new GE integral-type gear-motor



Westinghouse Life-Line H d-c motors and generators attain reliability and dynamic response with high-temperature silicone insulation, a new ventilating system, and reductions in armature inertia up to 55 per cent over previous values. The ventilating-system reverses traditional direction of air flow. By drawing in air at the drive end, distributing it positively between fields and armature, and discharging at the commutator end, the system achieves maximum use of internal fan action, expulsion of brush dust, and more effective cooling.

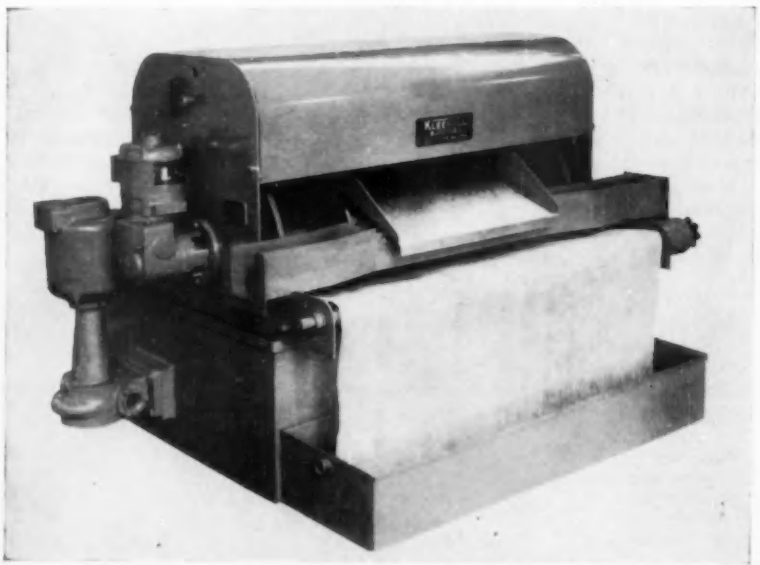
WESTINGHOUSE ELECTRIC CORP.

D-C MOTORS AND GENERATORS—Spanning motor ratings from 1 to 150 hp and generator ratings from ¾ to 100 kw, a new line of industrial d-c motors and generators contains features for improved performance and dependability from standard machines. Known as the Life-Line H series, they have drip-proof enclosures and bear NEMA Class B ratings.

By combining a high-temperature insulation system with a complement of copper and iron equal to that of conventional Class B machines, motor insulation life is indicated by accelerated life tests to have been increased at least 10 times. Normally, insulation will thus not be a limiting factor on motor and generator life, and it is equal to many emergency overloads, abnormal ambients, or rigorous duty cycles.

Circle 196 on postcard for more data

BARNES DRILL CO.



COOLANT FILTER—The Kleenall filter has been redesigned to achieve greater efficiency and ease of maintenance. The intake distributor has been changed from a pipe type to the trough type contained on the Model MP-20 separator illustrated, for facilitating clean-out of sludge and foreign material. Other changes include the drive being placed on the front idler shaft, greater area for sludge buildup, increased motor size on larger models, improved clutch design, and a heavier conveyor belt.

Circle 195 on postcard for more data

ASSEMBLY PRODUCTS, INC.

OVERLOAD CONTROL—Called the Load Sentry, an electro-mechanical control is intended for use wherever overload of any kind may be registered on an electric motor. It is built around the positive action of a contact meter-relay, and has no electron tubes. It is easily hooked into "start-stop" switches.

The maximum load to be permitted on the motor being monitored is set by an adjustable pointed anywhere

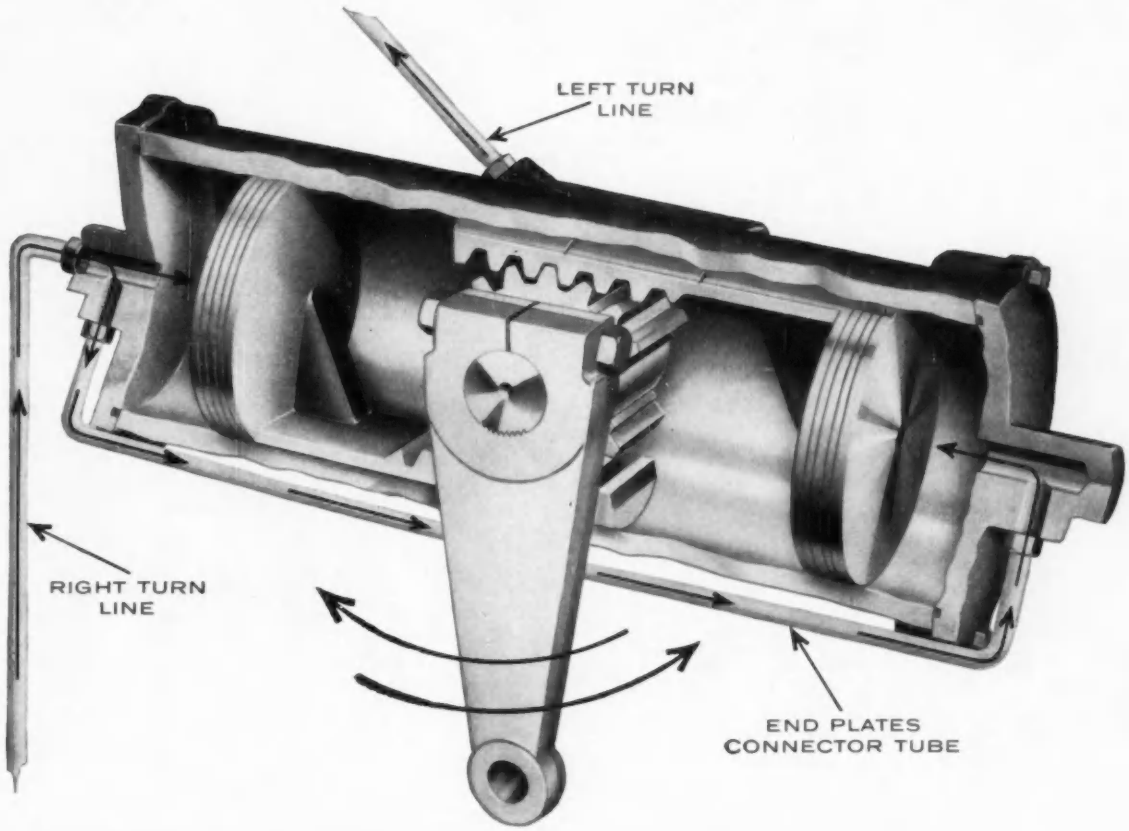


Load Sentry overload control mounted in NEMA 12 housing

on the dial of the meter-relay. The dial has 30 divisions ranging from zero to 150 per cent of normal load. Another pointer indicates the actual running load on the motor. When the pointers meet at an overload position, contacts lock, and the circuit is broken. The Load Sentry will then sound an alarm and/or shut down the system.

The device has two special safety

(*Turn to page* 202, *please*)



Now...a new kind of Power Cylinder to help you cut costs

THE new rotary motion Thompson Power Cylinder provides versatility of application, ease of installation, compactness and efficiency certain to solve many design and manufacturing problems. These features can cut your costs by simplifying production. It is now in use in a leading make of heavy-duty trucks.

Requiring a minimum of space, the Thompson Power Cylinder can be operated wherever hydraulic or pneumatic pressure is available. Operating from 600-1000 psi, at 700 psi it delivers approximately 26,000 inch pounds torque output. These parameters can be varied to obtain a custom installation. Also, over-running clutches, sprockets, gears, chains, etc., are easily adapted to the output shaft to further increase its versatility.

Precision engineered, the Thompson Power Cylinder is as dependable as it is versatile. You can count on a long, continuous, trouble-free life.

To learn more how the Thompson Power Cylinder can save you money in design, manufacture and installation costs, write for our free booklet. Described are many of its diverse uses and additional benefits. Mail to Thompson Products, Inc., Michigan Division, 34201 Van Dyke Avenue, Warren, Michigan.

You can count on

Thompson Products

Michigan Division:

Warren and Portland

News of the MACHINERY INDUSTRIES

Officials of the National Machine Tool Builders' Association Foresee a Substantial Increase in Orders for the Industry During Balance of 1957

By Charles A. Weinert

THERE has been a lack of optimism in some quarters of the machine tool industry arising understandably from first-half 1957 operating results. Generally, new business is down and shipments up over 1956, causing a dwindling of order backlogs. On the other hand, there is an air of confidence expressed by industry representatives, namely officials of the National Machine Tool Builders' Association. NMTBA spokesmen indicate that 1957 is likely to be a good peace-time year after all, and feel the outlook for the future is promising.

In order to give an overall view of the situation, we will present some figures recently cited in a talk by Jerome A. Raterman, president of the NMTBA. These will be supplemented by additional statistics, a number of which have materialized since Mr. Raterman's talk.

Mr. Raterman pointed out the following: During World War I the industry hit a peak of $220 million (1918 shipments). During World War II (in 1942) this reached the impressive total of $1.320 billion. Korea, in turn, produced a peak demand of $1.191 billion (in 1953). It is obvious, of course, that these latter volumes cannot be considered normal requirements, nor as criteria for judging a good or poor average business year.

Taking the peace-time years: Between World War I and World War II the industry produced an average volume of $99 million per year. During the years between World War II and Korea (1946-49) the average volume was $295 million. Since Korea (1954-57) the average billed sales volume has been about $825 million per year.

We will now take a look at the present picture: Sales (shipments) of machine tools for the first half of 1957 totaled $492.7 million. Net new orders (gross orders received adjusted downward for cancellations which included $7 million due to Air Force cut-backs) totaled $315.9 million. Comparable first-half figures for 1956 were: $418.2 million shipments, and $508.6 million net new orders. (For the complete year 1956 shipments totaled $886.15 million, and net new orders $924 million.)

It will be evident from the figures next above that shipments in 1957 are running ahead of incoming new orders; whereas the reverse was true in 1956. This circumstance sums up the basis for concern among the majority of the machine tool builders.

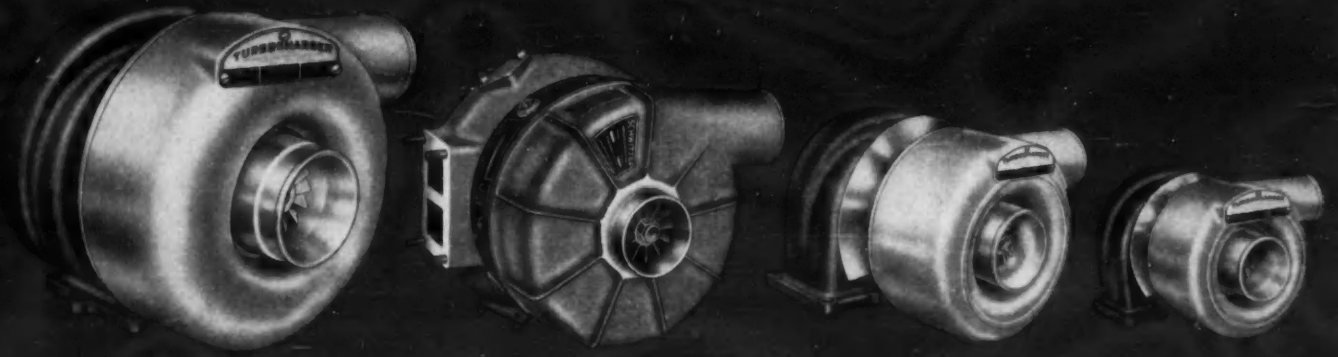
Conversely, it would appear from the estimated order backlog at the end of June, 1957, representing 4.2 months' output, that billings on shipments for the year 1957 will fall around $850 million total. While this volume will be under the $886.15 million for 1956, it is nevertheless an improvement over the post-Korea "peace-time"

(*Turn to page* 180, *please*)



Manufacture of mufflers is being facilitated by a fully-automatic shear line installed in Arvin Industries' Gladstone Plant, Columbus, Ind. It can handle, cutting doubles, 943 pieces per hour when running 28-gage coil stock. At this installation the shear line, produced by Union Tool Corp., Warsaw, Ind., operates in conjunction with a standard shear. An air-operated shear clutch and single handwheel for length adjustments are features of the line.

NEW ADVANCED DESIGN DEPENDABLE SCHWITZER TURBOS



MORE POWER • LIGHTER WEIGHT • FASTER RESPONSE • AIR COOLED

More Proven Performance, Mileage, Hours and Units
Expanded Line for Complete Coverage — 50 to 1,400 HP
Backed by 40 Years of Outstanding Engineering and Craftsmanship
Unequalled Turbo Experience in Gasoline and Diesel Installations

SCHWITZER CORPORATION · INDIANAPOLIS 7, INDIANA

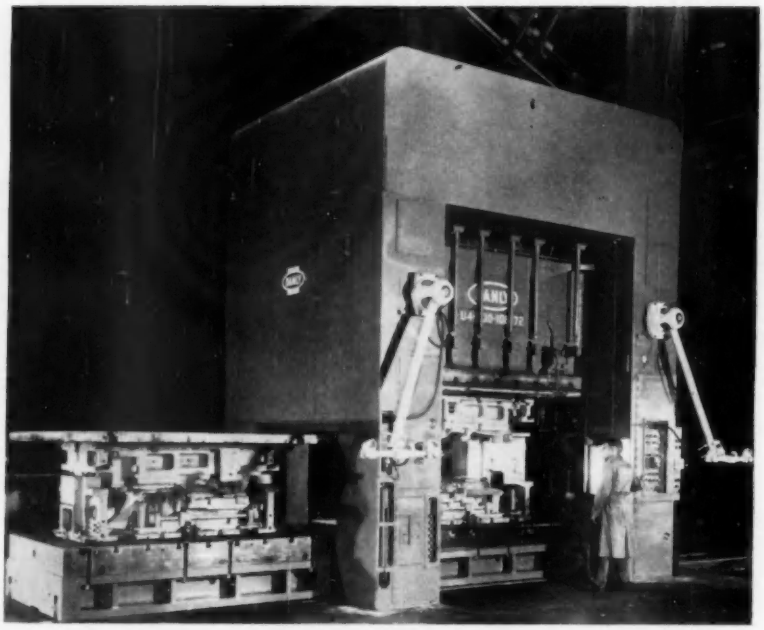
News of the

MACHINERY INDUSTRIES

(*Continued from page* 178)

average of $825 million per year.

Gross new orders (before adjustment for cancellations) in June, 1957 amounted to $53.8 million, up 17.5 per cent from May. While complete returns for the month of July were not in at press time, gross new business for that month is expected to amount to about $60 million. NMTBA officials are inclined to feel the low point in machine tool buying that occurred earlier this year has passed, and that new orders for the year 1957 will total around $700 million.



Danly 500-ton single-action quick-die-change press. One die is in the working position of the press and a second die has been installed on the die carrier outside the press. Die change can be accomplished in 30 minutes or less.

Danly Introduces New Quick Die Change Presses

Danly Machine Specialties, Inc. recently demonstrated the first two metalworking presses of a new design. The initial order, for a total of nine, is now being built for S.I.M.C.A. of France. The presses will form two production lines, one of five machines and the other of four, in a new plant the company is building at Manterre, France, in which will be incorporated production techniques used by automobile manufacturers here.

Each press line will be headed by a double-acting mechanical press, and all will be mechanical presses featuring quick die change for maximum flexibility. Quick die change is made possible on these Danly presses by using two bolster plates mounted on separate carriers, and incorporating a number of features that permit quick positioning of the bolster and die in the press. Die carriers are power-driven and pushbutton-operated, the power mechanism being built into the press. They are moved on tracks into or out of the working area under the press slide through side openings in the press uprights.

For die removal, the system involves lowering of the slide so that the mating dies are joined; detaching the upper die from the slide; and moving the bolster (with both halves of the die) out of the press to one side. The second bolster, carrying both halves of the die to be used next, is carried into place from the other side of the press, lowered to the bed of the press, keyed into position, and bolted down. The slide is then lowered, the upper half of the new die (fitted with adapter plate) is fastened to it by air-actuated clamps, and the new die is ready for operation. After any die has been tried out and its shut-height is known, the slide can be automatically adjusted by dialing the shut-height on the Danly automatic slide positioner. Die tryout is assisted by another Danly device, the Microinching Drive. Separately driven and operated by pushbutton, it offers full power stroking with accurate slide control at about one stroke per minute.

Use of side openings in the press uprights allows die change without disturbing loading and unloading mechanisms at the front or rear of the press, and in turn permits the presses to be placed closely together. The die carriers in loading positions may be located under crane-ways, facilitating die handling with cranes.

The two presses demonstrated consisted of a 600-ton double-acting model and a single-acting model rated at 500 tons. All presses of this type are underdriven and mounted on beams, so that each press, with its drive, can be positioned as a unit. To accommodate the building of these machines, Danly is completing construction of a new plant in which the presses can be assembled onto movable steel beams over pits. The new plant permits assembly of presses to an overall height of 65 ft, either from the pit or from the assembly floor.

E. W. Bliss Co. Reports First-Half Operations

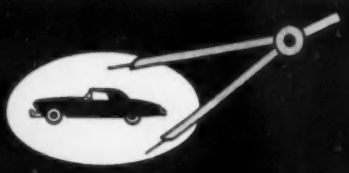
Earnings of E. W. Bliss Co. for the first half of this year exceeded those for the comparable 1956 period on approximately the same sales volume, according to a re-

(*Turn to page* 188, *please*)

USING

DU PONT ELASTOMERS

neoprene · Hypalon®

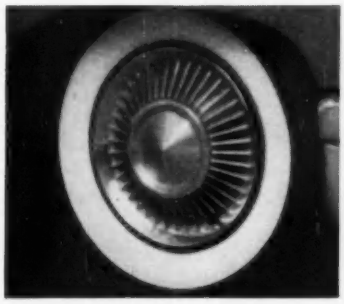


in design

Mercury's 1957 air conditioning system has 7 NEOPRENE parts

HYPALON® protects whitewalls from ozone cracking and discoloration

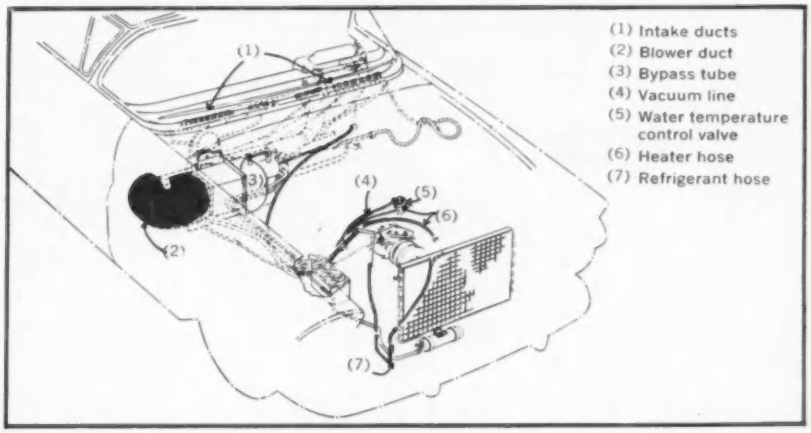
Small amounts of ozone in the air are a primary cause of whitewall deterioration. One tire maker combats this deteriorating



effect by using a special rubber compound containing a substantial amount of HYPALON—Du Pont's newest synthetic rubber. Road testing in areas where ozone concentrations run high showed that the whitewalls stayed white and free from cracks. The compound also proved to be highly resistant to abrasion.

The color stability of HYPALON and its outstanding resistance to ozone, high temperature and weather make it particularly useful in automotive applications. Spark plug boots, door and window strip and convertible tops are but a few current uses.

Mail the coupon for more information on HYPALON



(1) Intake ducts
(2) Blower duct
(3) Bypass tube
(4) Vacuum line
(5) Water temperature control valve
(6) Heater hose
(7) Refrigerant hose

Neoprene used for its resistance to heat, ozone, oil, coolants

Mercury for 1957 offers a completely new high-capacity air conditioning system. It is front-end mounted and has a single lever and blower-speed switch control. This unit contains so many neoprene components because neoprene resists deterioration by oil, heat, ozone, coolants—individually or in combination.

(1) Duct seals are closed-cell sponge neoprene. (2) The blower duct is fabric, reinforced by spiral wire, coated with neoprene. (3) The bypass tube, carrying cool air to the blower motor, is also neoprene. (4) The vacuum line is neoprene extruded tubing. (5) The water temperature control valve contains a die-cut neoprene diaphragm. (6) The heater hose tube and cover are made of neoprene. (7) The "Freon"* hose is neoprene covered.

Neoprene's resistance to oil, ozone and heat makes it particularly helpful in automotive design. Whether the part is sheet, sponge, tubing or is molded, neoprene's ability to retain its original properties insures long, reliable performance. For details on neoprene's properties and application data, just mail the coupon below.

*Reg. U. S. Pat. Off.

DU PONT

HYPALON *is a registered trademark of E. I. du Pont de Nemours & Co. (Inc.)*

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*



☐ I am particularly interested in _____

☐ Send me a free copy of *The Du Pont Elastomers* (a review of properties of neoprene and HYPALON).

☐ Add my name to the free mailing list of the *Elastomers Notebook* (contains articles based on uses of Du Pont elastomers in industry).

E. I. du Pont de Nemours & Co. (Inc.)
Elastomer Chemicals Dept. Al-9
Wilmington 98, Delaware

Name _____ Position _____

Firm _____

Address _____

City _____ State _____

AUTOMATION NEWS REPORT

AUTOMATIC CONTROLS

PRODUCTION—VEHICLES—AIRCRAFT

By Samuel Cummings

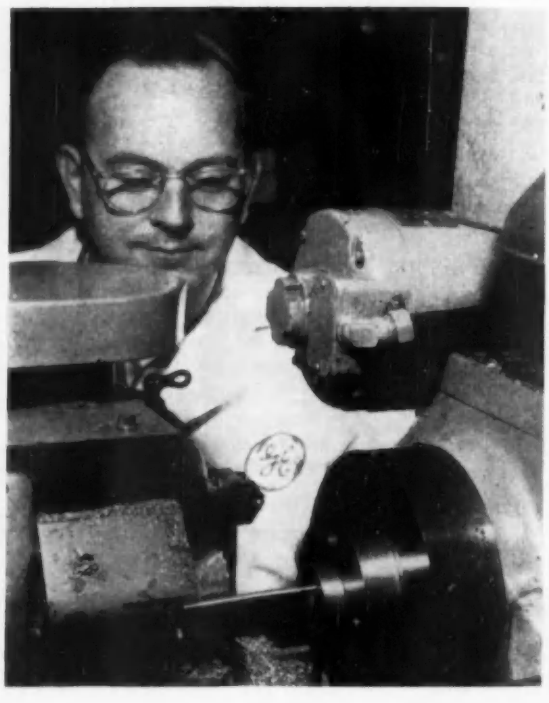
AIRFOIL MILLING MACHINE

Automated equipment like the airfoil milling machine shown below is speeding the development of new engines at General Electric Co.'s Small Aircraft Engine Dept., Lynn, Mass.

The machine makes a master jet engine blade, and then duplicates the pattern without touching the sensitive and flexible master blade. Contours of the master blade are followed by an electric contact method known as spark gap tracing. Jet engine blades, accurate to 0.001 in., are reproduced by the milling machine in from 20 to 30 minutes.

The Small Aircraft Engine Dept. has been working on the development of the T58 and J85 aircraft gas turbines.

General Electric airfoil milling machine turns out a jet engine blade in from 20 to 30 minutes



DIGITAL CONTROL COMPUTER

A new fully transistorized digital computer that can be used to automatically control a wide variety of manufacturing processes, including metals, has been developed by Ramo-Wooldridge Corp.

The new computer, known as the RW-300, automatically reads process instruments, analyzes process behavior fast enough for corrective action to be taken, and activates process mechanisms or adjusts set points on supervised control loops. It can start or shut down a process unit, select material flow paths, make instrument and process stability checks, and even check itself.

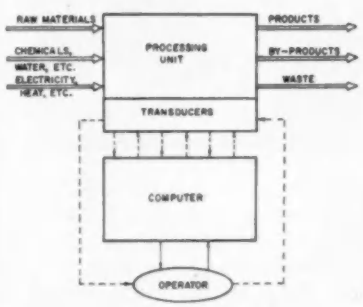
The RW-30 has integral input-output buffering, selection, and analog-digital conversion equipment, allowing it to be connected directly to practically any kind of process instrument or control device. Its input-output capacity can be adjusted to the requirements of the most complex process. Standard typewriter and punched paper tape are provided for input and output data.

Ramo-Wooldridge engineers say that the computer's flexibility and ease of programming make it ideal for research work in the process industries. It can be used for experimental control of pilot plant operations, as well as for such research functions as process design calculations, mass spectrometer and infrared analysis interpretations, and data logging and interpretation for test equipment.

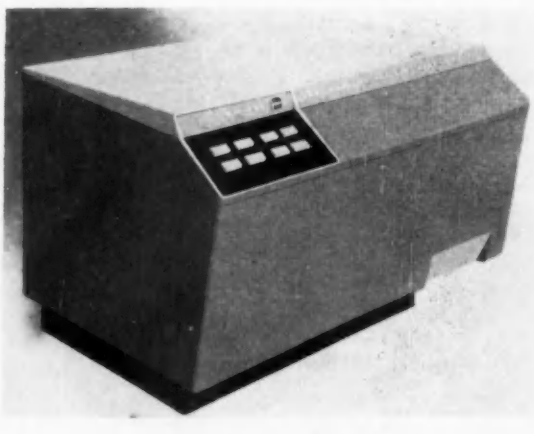
The computer is flexible enough, according to R-W engineers, so that it can be adapted to any number of applications with a minimum number of equipment changes. It is a compact machine—55 in. long, 29 in. wide, and 36 in. high—and weighs about 400 lb.

(*Turn to page* 188, *please*)

Schematic diagram of a computer control system



RW-300 digital control computer provides fully automatic control for industrial process plants, as shown below in artist's conception of the new device



Free INFORMATION SERVICE

Use either of these postcards for Free Literature listed below, or for more information on New Production Equipment and New Products described in this issue.

USE THIS POSTCARD

FREE LITERATURE

Radiant Heat 1

Bulletin 57-108, eight pages, describes 18 applications of radiant heating equipment in metal processing and includes data on processing temperatures, time cycles and oven design. *The Fostoria Pressed Steel Corp.*

Tools, Dies 2

A new eight-page brochure discusses means of eliminating cracking hazards in tool and die making, and gives information on design, how to make the tool, heat treatment and steel selection. *The Carpenter Steel Co.*

Teflon O-Rings 3

Chemically-inert gaskets, back-up rings and O-rings, made from Teflon, are described in six-page brochure P-327. *Crane Packing Co.*

Wall Chart 4

An attractive decimal equivalent wall chart, in 64ths in., has been made available by *Peninsular Steel Co.*

Shell-Mold Castings 5

Containing a photo story of casting procedure, eight-page booklet DB-52-250 also examines quality control, design considerations, materials, and typical shell-mold castings. *Westinghouse Electric Corp.*

Plastic Piping 6

The advantages and application of flexible pipe made from Alathon 25 polyethylene resin are detailed in "Pipe Facts" No. 9, 12 pages. *E. I. du Pont de Nemours & Co., Inc.*

Motor Starters 7

Bulletin 14B8615, 12 pages, describes a line of a-c motor starters and contactors in sizes 4, 5, and 6 (Type 425), 50 to 400 hp. *Allis-Chalmers Mfg Co.*

Surface Finish 8

A 24-page American Standard booklet on surface roughness, waviness and lay, recently published by the ASME, is available from *Brush Electronics Co.*

Plastics Machine 9

The features and specifications of a new 20 to 28-oz capacity plastics injection molding machine are contained in bulletin 5720, six pages. *The Hydraulic Press Mfg. Co.*

Overhead Cranes 10

Bulletin 15005-1-57, 28 pages, simplifies overhead electric traveling crane selection by giving full data on units with capacities through 20 tons and spans through 80 ft. *Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc.*

(Please turn page)

VOID after Nov. 1 — Circle numbers for Free Literature, or New Equipment information — 9/1/57

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154
155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176
177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242

NAME ..... TITLE .....
(Please Print)

COMPANY OR BUSINESS .....

ADDRESS .....
(No. & STREET) (CITY) (ZONE) (STATE)

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

POSTAGE WILL BE PAID BY

AUTOMOTIVE INDUSTRIES
P. O. Box 66,
Village Station,
New York 14, N. Y.

Readers Service Dept.

Control Centers 11

Booklet EL-174, 32 pages, features a new concept of modular design which presents a wide variety of motor control in a central structure. *Cutler-Hammer, Inc.*

Fibre Containers 12

A 16-page catalog lists a complete line of materials handling containers constructed of vulcanized fibre. *Continental-Diamond Fibre Corp.*

Chucks 13

Catalog P. O. 65, 75 pages, describes a comprehensive line of air-operated chucks, cylinders and accessory equipment. *The Cushman Chuck Co.*

Industrial Tires 14

Written for maintenance men, industrial engineers and purchasing agents, a 36-page illustrated guide book explains all phases of industrial tire use. *B. F. Goodrich Tire Co.*

Heat-Resistant Castings 15

Technical data sheets giving up-to-date information on heat-resistant cast high alloys, and bound in a file folder, are now available from *Alloy Casting Institute.*

Electric Brake 16

The features of a redesigned electric disk brake for industrial applications are covered in eight-page brochure SK-4896. *Star-Kimble Industrial Motor Div., Safety Industries, Inc.*

USE THIS POSTCARD

Welding Guide 17

Welding Guide

Bulletin ER6577, entitled "Guide to Better Welding," is a 40-page booklet which gives tips on rod selection, what amperages to use, and characteristics of the company's line of rods and electrodes. *Marquette Mfg. Co.*

Liquid Measurement 18

Catalog 15A100, four pages, describes an auto-sampling device which continuously measures and records both the temperature and the temperature-compensated viscosity of liquids flowing in process piping. *Fischer & Porter Co.*

Fork Truck 19

Bulletin YR-60-A, four pages, describes in detail the features, specifications and operating characteristics of a 6000-lb capacity fork truck for outside handling. *Clark Equipment Co.*

Assembly Tools 20

Four-page bulletin B-1 on automatic parts handling and assembling equipment, features standardized units that can be used to automate small parts assembly operations. *Dixon Automatic Tool, Inc.*

Vacuum Equipment 21

A 22-page general catalog explains the operating principles and gives specifications of a complete line of high-vacuum equipment for laboratory and industrial applications. *Consolidated Electrodynamics Corp.*

Ceramic 22

Bulletin 110, two pages, contains technical data on a new ceramic which is capable of resisting rapid changes in temperature up to 2200 F. *Duramic Prod., Div., Technion Design & Mfg. Co., Inc.*

Titanium Carbides 23

The physical properties of 13 heat-resistant titanium carbide alloys and their applications in the metalworking industries are presented in bulletin B-444, 12 pages. *Kennametal, Inc.*

Grinding Wheels

Revised standards for shape types and sizes of grinding wheels (simplified practice recommendation R45-57) are now available in a 76-page booklet. Address request on company letterhead to *Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.*

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

POSTAGE WILL BE PAID BY

AUTOMOTIVE INDUSTRIES
P. O. Box 66,
Village Station,
New York 14, N. Y.

Readers Service Dept.

VOID after Nov. 1 — Circle numbers for Free Literature, or New Equipment Information — 9/1/57

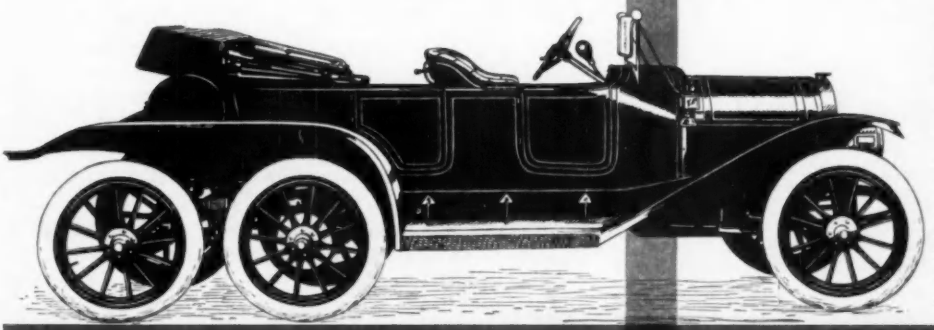
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154
155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176
177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242

NAME ..... TITLE .....
(Please Print)

COMPANY OR BUSINESS .....

ADDRESS ..... (No. & STREET) (CITY) (ZONE) (STATE)

YESTERDAY...



when compression ratios were 3 to 1, any good oil ring would do...as in this sexy 1912 Reeves "Sextoauto". Virtues claimed for the six-wheel principle included a "ride like a Pullman Palace Car" and a reduction in tire trouble and expense.

TODAY...



U.S. patents 2,635,022 and 2,695,825

It takes the PC type "98" chrome oil ring!

The Perfect Circle Type "98" Chrome oil ring was specifically designed to meet the exacting demands of today's high-compression engines. Featuring universal application, bottomless and conventional grooves, all depths, the PC Type "98" oil ring was the first to have a patented side-sealing action with multiple tiny springs that exert both side and radial pressure. And of utmost importance, Type "98" Chrome Oil Rings provide maximum oil drainage! Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., 888 Don Mills Road, Don Mills, Ontario.

PERFECT CIRCLE

PISTON RINGS

Preferred by more people than any other brand!

METALS

Upturn in Steel Demand Seems Certain, but No Shortage is Foreseen. Copper Price Falls; Lead Zinc Sales Improve.

By William F. Boericke

Steel Prospects Improve

Most steel executives have raised their sights for third quarter operations. A few months ago there was philosophic acceptance of an 80 per cent rate or lower until fall. Now talk of an 84 per cent rate is not deemed over-optimistic. Most steel producers look for a healthy rise in automobile orders in September, and there is considerable satisfaction over an upturn from the appliance makers. While the mills at mid-August had no positive information on the strength of demand from the automobile makers for the rest of the year, it is more than wishful thinking that dictates their optimism. *Iron Age* puts it succinctly, "For most mills the upturn in steel demand is a foregone conclusion. It's simply a matter of degree."

However, buyers are confident of an adequate steel supply and are sure there will be no shortage, always excepting heavy structurals and plates which are still in heavy demand. While sales of strip and sheet have lagged for months, they are expected to regain their former top position in the industry when Detroit gives the buying signal. Because of this probability there is less eagerness to accept light plate orders for production on sheet-strip mills. Consequently the heat is on again for the plate mills which had heretofore been able to give almost exclusive attention to heavy steels. It does not seem probable that new capacity will balance supply of structurals and plate with demand before mid-1958. Structurals for the third quarter are on an allotment basis.

First Seven Months a Record

It now appears that July will show up in the records as low month of the year with an operating rate of 78.5 per cent of capacity. The output of nearly 8.9 million tons was the lowest for over a year. However, for the first seven months production of ingots and steel for castings totalled about 69.5 million tons and actually the January-July record was better than the figures indicate. No doubt much of the buying in the comparable 1956 period represented hedging in anticipation of a prolonged steel strike and was in excess of consumption. This was not the case in 1957 and little or no precautionary buying occurred prior to the widely anticipated increase in steel prices that followed the wage hike. Hence the true rate of consumption of steel in the first seven months of 1957 was probably more than in the same period last year.

Nothing certain is known about actual condition of steel users' inventories. For many months they have been believed to be low, but no strong effort to replenish them has been in evidence. If a concerted effort were to be made to restore them, it could well result in a sudden rise in mill operating rate. There has been too much easy reliance upon letting the mills act as warehouses for emergency tonnages.

Sales of Alloy Steel Off

Second quarter sales for the alloy steel manufacturers in general registered a sharper drop than for the carbon steel makers, as they were hit relatively harder by the fall-off in orders from Detroit. Yet the same comment holds, that consumption of stainless and alloy steels has exceeded purchases, the difference being caused by inventory reductions. Manufacturers of tool steel have not ceased their indefatigable efforts to improve their products for supersonic airplanes and guided missiles, particularly for airplane skins and frames. Notable among the many new die steels is Vanadium-Alloys Vascojet claimed to have the lowest alloy analysis for maximum toughness and strength retention at high temperatures. Strength-weight characteristics are wanted in the range of 800-1200 F with 300,000 psi at room temperatures and 260,000 at high temperatures for sustained periods. These standards have not yet been achieved but it appears they may be attained with some modification of requirements of the airplane makers.

Steel Expansion Abroad

Programs for steel expansion are not confined to this country. The Venezuelan Government is pushing construction of a $330 million steel plant expected to start production early in 1959 with an initial output of 700,000 tons. This is to be gradually boosted to 1,200,000. Two Italian firms are building the plant. The enormous iron ore reserves of Venezuela, estimated to exceed 3 billion tons, give ample assurance of adequate supply of raw material for an indefinite period. German, Dutch, and Italian interests are busy on the Fort Gourand iron deposits in Mauretania which are said to contain over 100 million tons of high grade iron ore comparable to the best Swedish ores. It is proposed to mine the deposit at the rate of 4 million tons a year. Initial capital costs to bring the deposit into production would exceed $140 million.

(*Turn to page* 104, *please*)

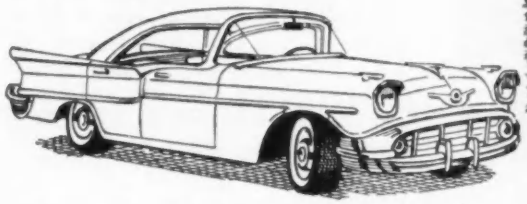
Rapidly becoming the

Standard of the Automotive Industry

INCREASES ENGINE LIFE UP TO 400%

STERLING'S great "Conformatic" piston with "Intra-Cast" steel ring groove liners give sensationally longer life to rings and grooves—

Recommended clearances for "Conformatic" pistons are from 0 to ½ thousandth inch. This clearance is maintained hot and cold providing unbelievable bore stability.

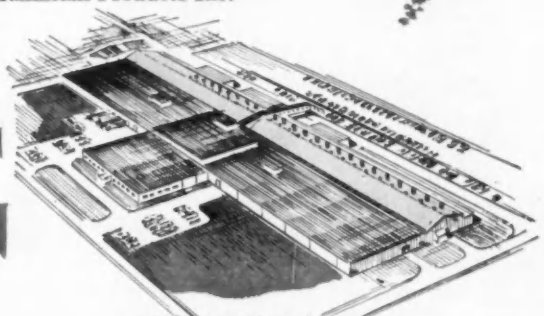


Sterling's revolutionary *Conformatic* piston already has been accepted and is now being used in a number of America's finest and most popular passenger cars.



STERLING'S CONFORMATIC PISTON WITH INTRA-CAST STEEL LINED GROOVES

prevents frictional horsepower loss, reduces oil consumption to an absolute minimum, and prolongs engine life up to 400%. *Intra-Cast* and *Conformatic* are registered trade names of STERLING Aluminum Products Inc.



NEW MANUFACTURING FACILITIES FOR STERLING ALUMINUM

120 acres! Completely new automated plant at the confluence of the Missouri and Mississippi Rivers

SA-1

STERLING

ALUMINUM PRODUCTS INC.

ST. CHARLES, MISSOURI

WORLD'S LARGEST MANUFACTURER OF ALUMINUM ALLOY PISTONS

AUTOMATION NEWS REPORT

(*Continued from page* 182)

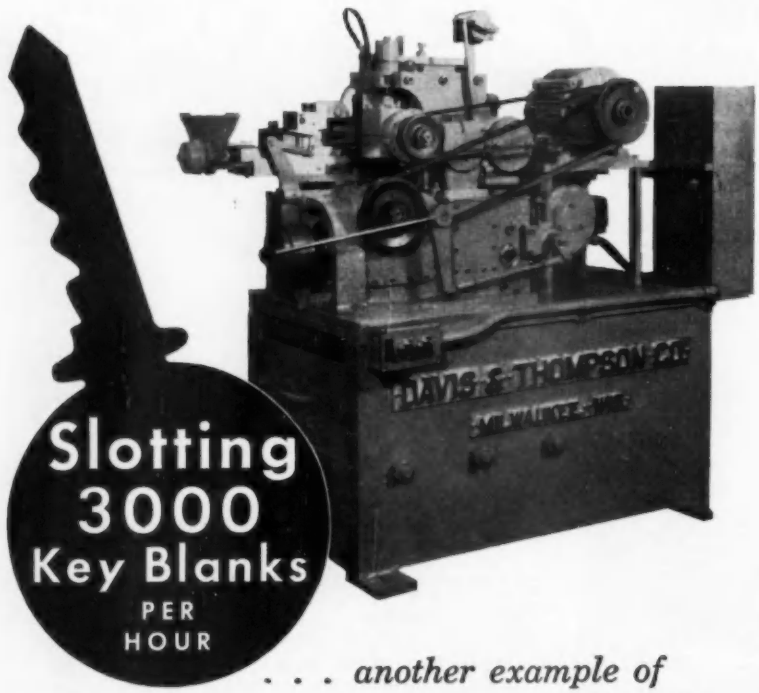
TINY SPACISTOR

Raytheon Manufacturing Co. has developed a semiconductor that operates electrically like a vacuum tube and yet is as compact as a transistor.

Raytheon scientists predict that the new device, called a spacistor, will amplify at frequencies up to 10,000 megacycles and operate at temperatures up to 500 C. Present transistors handle much lower frequencies and will not operate effectively at temperatures above 200 C.

The spacistor retains many transistor advantages. It operates on a fraction of vacuum tube power, and has no filament to heat. In addition, it can be tightly packaged in minute assemblies.

The new product, which is still three to five years from production, will find its greatest application, Raytheon officials say, in rocket and guided missile applications, where reliability of electronic instruments at higher temperatures is a major problem.



Slotting 3000 Key Blanks PER HOUR

. . . another example of
Davis & Thompson Production Engineering

If you need high production in milling, drilling, boring and similar metalworking operations . . . with a minimum of equipment and capital expenditure, call in a Davis and Thompson Representative.

This key blank slotting machine is only one of countless machining problems solved by D & T Engineers.

Space does not permit describing this machine in full detail, but if you would like complete details, write.



ADDITIONAL INFORMATION

Get the complete story of the facilities available from Davis and Thompson. Write for this 8-page bulletin today. Ask for Bulletin 1002.

Roto-Matic

Davis and Thompson Co.

4460 N. 124th ST. . . . MILWAUKEE 10, WISCONSIN

MACHINERY NEWS

(*Continued from page* 180)

cent report. This favorable showing reflected, in part, operating economies which resulted from new equipment installed during the company's plant improvement program.

Sales for the six months ended June 30, 1957, amounted to $39,994,755 as compared with $40,179,662 for the 1956 period. Profit before provision for Federal income taxes was $3,331,609 as against 1956 first-half pre-tax earnings of $3,124,273. Net income, after taxes, totaled $1,590,016, or $1.58 per share, as compared with 1956 net earnings of $1,487,273, or $1.48 per share.

The backlog of unfilled orders at June 30, 1957 was slightly in excess of $40 million as compared with $48.4 million at March 31, 1957.

Fiat of Italy to Buy U.S. Machine Tools

Fifty U. S. suppliers will participate in sales of machinery and equipment to Fiat of Turin, Italy, under a $5 million credit authorized by the Export-Import Bank of Washington, according to Samuel C. Waugh, president of the Bank. Prospective orders under the credit vary in size from a single order totaling $900,000 to four orders for $10,000 each.

Approximately 98 items of special machinery and equipment will be bought. The purchases will consist of automatic grinders, lathes, cutting machines, boring machines, large presses, and miscellaneous precision machines. The equipment will be used in the company's automobile division.



These un-retouched photographs show non-aluminized and aluminized low-alloy inlet valves after tests under similar conditions.

For Important Savings in Your Engine Costs Use EATON Aluminized Inlet Valves

Modern high-output engines require inlet valves with superior scale resistance. Heat resistant alloys have solved this problem, but at a cost premium. Valves made of low cost materials and aluminized by the Eaton aluminizing process have corrosion resistant qualities equal to, or better than, valves made of higher priced alloy materials.

Let our engineers help you apply the cost-saving benefits of Eaton aluminized inlet valves to your engines.



Plain carbon steel valve with aluminized face after exaggerated test of 16 hours in air atmosphere at 2000°F. Note the gross oxidation of the non-aluminized stem area and the excellent condition of the aluminized seat-face and margin.

EATON

VALVE DIVISION
MANUFACTURING COMPANY
9771 FRENCH ROAD • DETROIT 13, MICHIGAN

PRODUCTS: Engine Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Hydraulic Pumps Motor Truck Axles • Permanent Mold Gray Iron Castings • Forgings • Heater-Defroster Units • Automotive Air Conditioning Fastening Devices • Cold Drawn Steel • Stampings • Gears • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



with the LIPE Automatic MAGAZINE LOADING BAR FEED"

says Screw Machine Foreman Willis J. Forbes*

Up to six months ago, the record per-machine production in our department for a single day was 5760 pieces. Our best monthly average was 5300 pieces per day. We tried out a Lipe A.M.L. to feed one machine, turning at the same cutting speed as before. In the first full day of operation, the A.M.L.-fed machine matched our top monthly average by 1:25 P.M. . . . and ended the day at 4:00 P.M. with a production of 7823 pieces! It has continued to turn out that number daily, *for six months!*

Why? The Lipe A.M.L. feeds stock continuously: No repeat motion for feed-outs. No down-time for changing feed fingers, or for remnant disposal. No cutting air — and when you stop cutting air, you start cutting costs. That's why we are now equipping our department throughout with Lipe A.M.L. Bar Feeds.

WRITE OR WIRE for a FREE Lipe Sales Engineering estimate of production increases, savings and amortization time of Lipe A.M.L. Bar Feeds in your production layout.

*Photographer's models and pseudonyms used to protect company identity and confidential information.

Lipe-ROLLWAY CORPORATION SYRACUSE 1, N. Y.

MACHINE TOOLS • HEAVY-DUTY AUTOMOTIVE CLUTCHES • PORTABLE POWER HACK SAWS



ON OUR WASHINGTON WIRE

Aircraft manufacturers are finding out that the Air Force is both firm and serious in its plans to cut back sharply on plane procurement. The changeover from manned aircraft to missiles will result in fewer orders and fewer contractors. Subcontractors also will have to scramble even faster to stay in the Air Force procurement picture by next year because prime contractors will tend to take on themselves jobs formerly subcontracted out. Actually, the Air Force will continue to spend as many dollars as in the past, but fewer companies will share in the overall procurement program.

Peaceful uses of the hot-cut, cold-draw metalworking method are seen as feasible. It could be used to run out parts of suspension units for cars and to build tractor track-shoe parts. Artillery shells up to 8-in. dia, when built by this process, use less material and require fewer manhours.

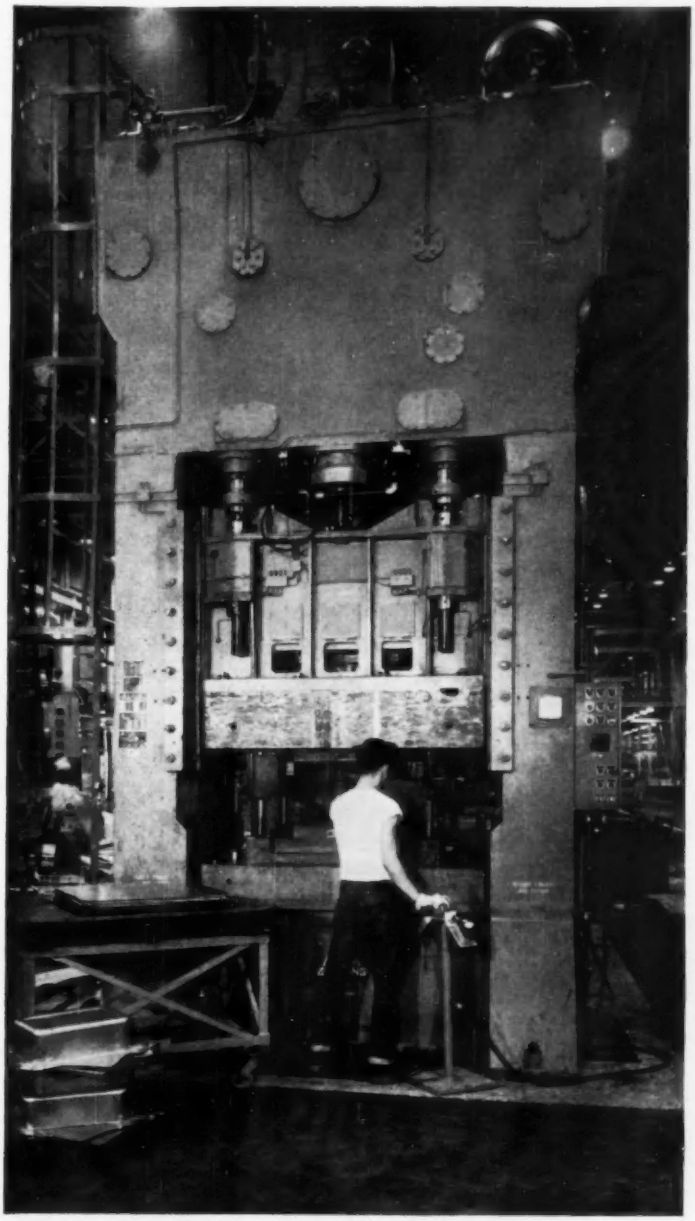
Business may soon be relieved of a large part of the detailed and costly record-keeping required by the Federal Government. A new proposal under study by Federal income tax officials would replace present vague and indefinite regulations with specific periods during which records would have to be kept.

Very few U. S. firms, the Government admits, have a vested interest in munitions making. Some aircraft companies, of course, turn out most or all of their products for the military. But another large group, the automobile makers, finds government sales not too profitable. A return of more than 5 or 6 per cent on a military order is unusual.

Westinghouse Press Control with CYPAK

is three-ways safe...

for operator, machine and work.



Westinghouse Press Control with CYPAK* offers a new high in industrial safety for machine operator, the machine dies and blanks, and work material.

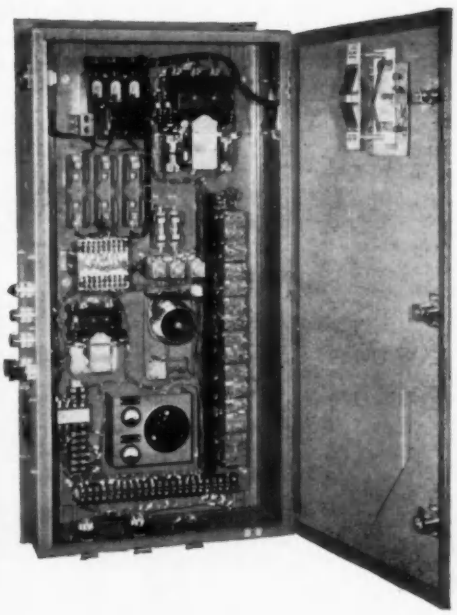
Because CYPAK eliminates the use of relays, there are no mechanical parts to stick or jam in the control and cause a repeat of the press. Patented anti-repeat clutch control circuit is self-checking, calling for two impulses to initiate a stroke.

Standard control has a four-position selector switch and run-pushbutton that are key-locked. An externally operated circuit breaker is another safety feature.

For complete information on reliably safe Westinghouse Press Control with CYPAK, call your Westinghouse Sales Engineer. Or, write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

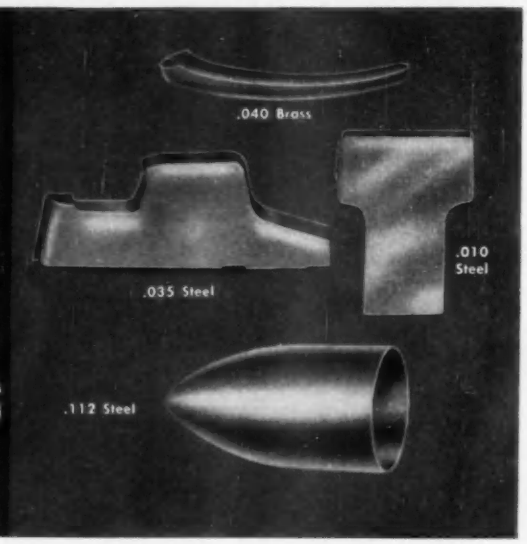
*Trade-Mark

J-22050



YOU CAN BE SURE...IF IT'S Westinghouse

Eliminate Multiple Trimming Operations



Increase output . . . reduce costs!

Costly, time-consuming trimming and notching operations can be done in one operation with a Brehm Trimming Die. Don't worry about stock thickness. Edges will be of full thickness — clean, flat, without burrs or distortion at the trimmed edge.

Other Brehm Die advantages! **Workable Materials** — gold, silver, stainless or mild steel, copper, brass, refrigerator doors, auto bumperbuf zinc, aluminum, fiber, rubber, plastics, **Quantities vary** — Stove or refrigerator doors, auto bumper buffers or typewriter covers, from 264 to 900 per hour. Intermediate parts, where stock and scrap can be blown from the die, about 1350 per hour. **Shapes** — fountain-pen ferrules, artillery cases, watch cases, burial valuts, automotive, kitchen, radio and television accessories and parts. Almost anything you need trimmed.

A Brehm "Shimmy" Trimming Die with angular cams, cuts four ways in one press stroke, handling straight or curved edge contours, with multiple notches and projections. Slow, costly "horn" and "pinch" trimming operations, are eliminated.

Send part prints for quotation on Brehm "Shimmy" and related dies, such as blank, form, pierce.

THE SHIMMY DIE — VULCAN TOOL CORPORATION — REGISTERED U.S. PATENT OFF.

Brehm® trimming dies

41ST YEAR OF VULCAN SERVICE

ENGINEERING . . . PROCESSING . . . BUILDING SPECIAL MACHINES . . . VULCANAIRE JIG GRINDERS . . . MOTORIZED ROTARY TABLES . . . BREHM SHIMMY AND RELATED DIES

VULCAN TOOL CO. (YOUR TOOL ROOM IN DAYTON)
BREHM DIE DIVISION • 771 LORAIN AVENUE • DAYTON 10, OHIO

VULCAN tools

SHORTIES

Production costs of aircraft and guided missiles will climb sharply in 1958 if concerns in this work grant the "substantial" wage increases that the AFL-CIO Machinists' union says it will insist upon.

•

U. S. military jet engines of one type are flown six million miles daily. This is equivalent to an airline operating 360 four-engine transports.

•

Family ownership of passenger cars climbed from 68 per cent to 74 per cent, and families owning two or more passenger cars increased from 3 per cent to 10 per cent.

•

Jet-powered commercial airliners, designed to carry as many as 140 passengers, will have a petroleum fuel capacity of 18,000 gal—enough to fill about three railroad tank cars.

•

If all the earth moved in the U. S. in one week by oil-powered and oil-lubricated machines were dumped at one place, it would form a peak as high as the Rockies.

•

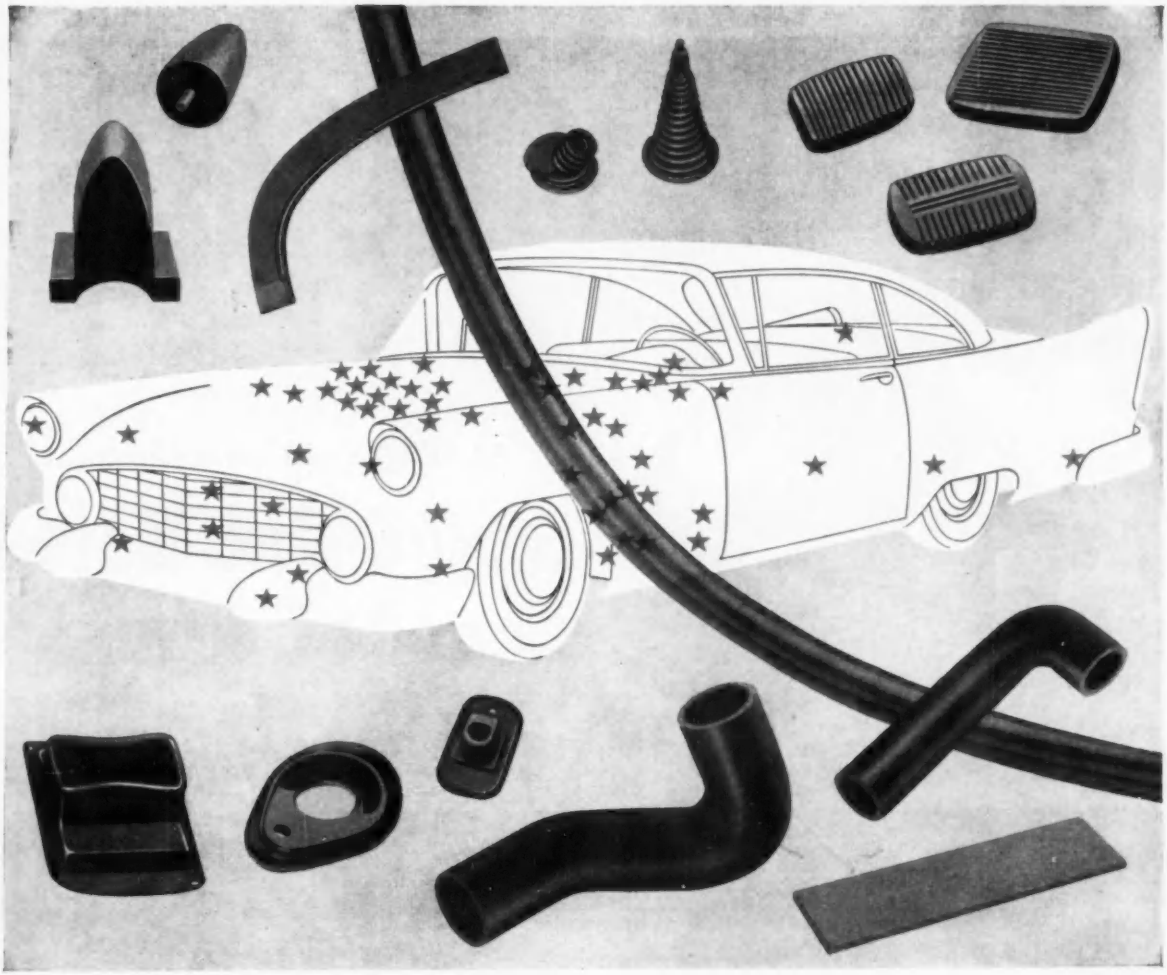
The $5000-a-year family in 1939 paid Uncle Sam $59 in taxes; kept $4941. It now takes $10,583 to match this. Of this income, the Government collects $1511, while inflation's toll is $4131.

•

To achieve a speed of 450 mph, a World War II fighter required 2200 hp. Today, 14,300 hp is required to enable a jet fighter to fly 800 mph and 25,450 hp is required to fly a plane at 1000 mph.

•

To fly at Mach 2, a plane must be capable of operation in a temperature of about 210 F, the temperature of boiling water. At Mach 3, temperature requirements go up to 500 F, and at Mach 4 the external surface must withstand a temperature of 1000 F.



★ some of the more than 100 places where ENJAY BUTYL works, silently and dependably, helping to improve the performance of today's new cars.

ENJAY BUTYL—fabulous all-weather rubber BOOSTS PERFORMANCE IN '57 CARS

Molded into more than 100 parts, this super-durable, all-weather rubber helps provide a steadier, softer, more silent ride under even the most strenuous conditions of stress, weather change, and abrasive action. The dependability of all these parts contributes to the outstanding performance of the modern car.

Readily available in non-staining grades, Enjay Butyl rubber can be compounded into white and light-colored parts that combine beauty with top-notch performance. Low in cost, it out-performs and out-lasts all other rubbers formerly used, and may well be able to *cut costs* and *improve performance* in *your* product. For further information, and for expert technical assistance, contact the Enjay Company.

ENJAY BUTYL

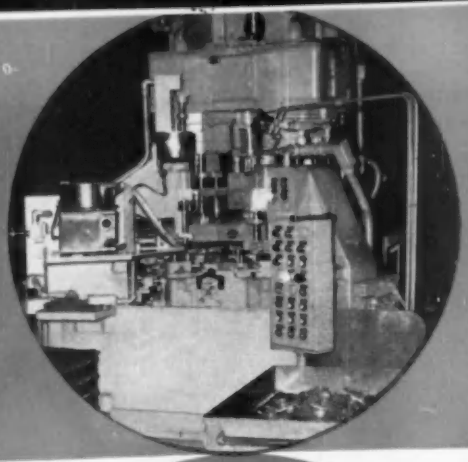
Enjay Butyl is the greatest rubber value in the world . . . the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

ENJAY

Pioneer in Petrochemicals

ENJAY COMPANY, INC., 15 West 51st Street, New York 19, N. Y.

Akron • Boston • Chicago • Detroit • Los Angeles • New Orleans • Tulsa





Two sizes of motor end-plates are assembled, bored, drilled and tapped in a Natco 3-Way Machine.

At Wagner Electric Corporation

One Natco



NATCO

Assembles, Bores, Drills and Taps... Reduces Labor Cost 70% On Small Motor End-Plates

This Natco combination assembly and multi-drilling machine presses a bearing sleeve into the end-plate, rough and finish bores the outside bearing-cap hole, drills an oiler hole at an angle, drills four (4) thru-bolt holes, and drills and taps two (2) 8x32 cover plate holes. *Production is 170 pieces per hour.*

This Natco accommodates two sizes of motor end-plates without changes in the basic rotary-table tooling. In addition to this important versatility the engineers at Wagner Electric point out these other advantages:

- *one operator* controls the assembly and machining from one station.
- *work scheduling* is simplified due to the short machine cycle.
- *in-process inventory* can be kept at a minimum because of high production rate.
- *floor space* is made available for other operations.

Natcos perform all kinds of drilling, boring, facing and tapping jobs in every conceivable combination and sequence.

Ask the Natco Field Engineer about the newly perfected tape control systems for Natco production tools.

National Automatic Tool Company, Inc.

Richmond, Indiana *Multi-spindle drilling, boring and tapping machines. Special machines for automatic production. Call Natco Offices in Chicago, Detroit, New York, Buffalo, Philadelphia, Cleveland, Los Angeles; distributors in other cities.*

Trends in the Construction Equipment Industry

By Kenneth Rose

STATISTICS prepared by the U. S. Bureau of the Census upon the amounts of construction machinery shipped during 1956 have just been released. They show that construction machinery shipments totaled nearly $1300 million in 1956, which was about 30 per cent above the 1955 amount. Equipment other than cranes and shovels amounted to $970 millions, an increase of 34 per cent over the preceding year, and cranes and shovels shipped were valued at $329 millions, up 29 per cent from the year before.

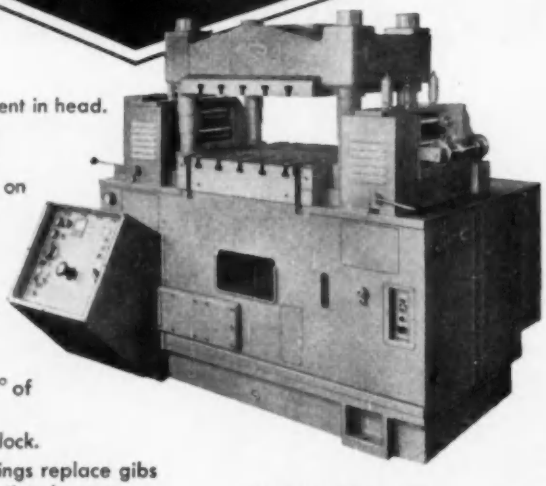
R. S. Stevenson, president of Allis-Chalmers Mfg. Co., Milwaukee, predicted that the Federal roadbuilding program would cost from $50 to $100 billions more than anticipated. Much of this will result from expansion of the program beyond the 41,000 miles of interstate highways planned, he said. Even though the work has barely begun, it is already becoming evident that the 41,000 miles of expressway will not adequately provide for the rapidly growing motor transport.

"The Federal Government, under existing laws, has agreed to pay 90 per cent of the cost of this 41,000 miles of interstate system. Under much older laws, it is paying 50 per cent of the cost of a much more extensive system of Federal aid roads.

"What I predict is that Congress in five or six years will recognize that the Government, in order to expedite construction, must contribute more than 50 per cent of the cost of modernizing that part of the old Federal aid system needed to complement the 41,000 miles of expressways."

The construction equipment manufacturers, expanded to take care of the construction industry's present and future needs, are marking time during the present period of generally less-than-capacity business. Unusually wet weather has delayed contractors over much of the country, but in the South especially. The Federal Highway Program is still largely in its preliminary stage, during which routes must be selected, rights-of-way acquired, and the engineering preliminaries done. Inventories of construction equipment are building up, but most manufacturers are curtailing production to bring it into line with present demand and the estimated demand in the very near future. Estimates as to when construction industry will pick up seem to center about the first quarter of 1958, with the highway program accelerating from about the second quarter onward. The program is already accelerating, and is actually somewhat ahead of con-

ALPHA
TWO POINT
BACK GEAR UNDER DRIVE
PRODUCTION PRESSES
Capacity of 75 to 200 tons



Outstanding Features

- Shut height adjustment in head.
- Center drive type herringbone gears.
- Scrap cutter action on up-stroke of press.
- Cam adjustments for brake & roll feeds.
- Micro adjustment of metal travel.
- Timing of scrap cutter from 0° to 45° of up-stroke of press.
- Positive shut height lock.
- Bronze sleeve bearings replace gibs as utilized on conventional presses.

These precision presses are basically precision operating, high-speed automatic stamping presses. They have built-in precision in the same terms as the word "precision" is associated with modern machine tools. This inherent quality has been designed into these presses from the ground up.

NO PITS REQUIRED.

UNBALANCED DIES can be handled without distortion.

FAST, ACCURATE, WILL GIVE LONG TROUBLE-FREE SERVICE and LONG DIE LIFE.

PRESSES UP TO 300 TON CAPACITY, AVAILABLE TO CUSTOMER PARTICULAR REQUIREMENTS.

Write for Catalog

ALPHA PRESS & MACHINE, INC.

9281 Freeland Avenue • Detroit 28, Michigan

Can Nalco Offices in Chicago, Detroit, New York, Buffalo, Philadelphia, Cleveland, Los Angeles, Distributors in other cities

DU PONT

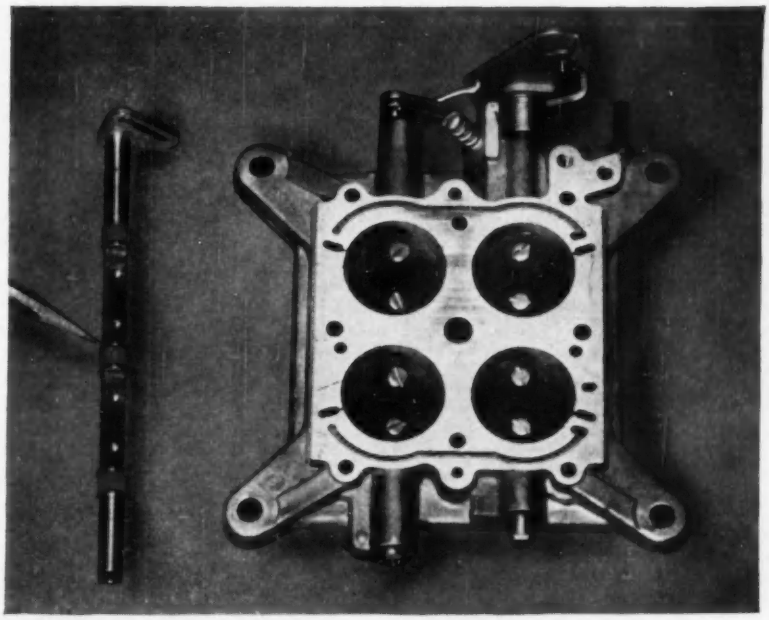
Better Things for Better Living . . . through Chemistry

AUTOMOTIVE ENGINEERING NEWS

LATEST PROPERTY AND APPLICATION DATA ON

TEFLON® tetrafluoroethylene resins

Carburetor bearings made of Du Pont TEFLON® tetrafluoroethylene resins solve sticking problem, cut fabrication costs



SLEEVE BEARINGS of a TEFLON resin on the primary throttle shaft of new carburetors have eliminated the serious problem of slip-stick action caused by gums in gasoline and have reduced fabrication costs. Many 1957 automobiles are equipped with these improved carburetors. (Mfd. by Holley Carburetor Company, Van Dyke, Michigan. Sleeve bearings of TEFLON 1 by Modern Industrial Plastics, Inc., Dayton, Ohio.)

The commonly encountered problem of slip-stick action was eliminated in production carburetors by redesigning with bearings of a TEFLON resin. Added to the benefit of improved performance was a drastic lowering of bearing costs. Previously, throttle shafts had been chrome-plated. The use of bearings of a TEFLON resin cut costs 28 times.

Here, the extremely low coefficient of friction of bearings of TEFLON tetrafluoroethylene resins was used to good advantage. (In addition, the static and kinetic coefficient of friction of bearings of TEFLON resins is the same.) Many other examples can be cited where this property was successfully applied in automotive assemblies. In one such instance, sleeves of a TEFLON resin were used to replace oilite bearings in truck distributors. Bearing costs were reduced 12 times.

Other advantages go hand in hand with the use of TEFLON resins. Maintenance is often eliminated. TEFLON tetrafluoroethylene resins used for gasketing will never rot or crumble. No automotive chemical or exhaust product can damage them. They are unaffected by temperatures to 500°F. and will not lose their toughness or become brittle even at cold temperatures that turn alcohol to slush. Parts made of TEFLON resins do not swell or deteriorate in any way as a result of weather extremes or wet conditions and can be designed into assemblies where lubrication is difficult or impossible.

Take advantage of the many mechanical, electrical, chemical and thermal properties of TEFLON tetrafluoroethylene resins for your designs. Make sure you're not overlooking any of the outstanding properties of this unusual engineering material. Mail coupon today.





SHOCK-ABSORBING and suspension systems may well be improved by taking a hint from this aircraft nose gear design. It uses scraper rings and spiral back-ups fabricated from a TEFLON tetrafluoroethylene resin. No hydraulic fluid can injure this tough material. Seals of TEFLON resins compensate for bore irregularities . . . reduce leakage to a minimum. TEFLON resins are ideal for making pneumatic and hydraulic seals and packings.

TEFLON®

is a registered trademark...

TEFLON is Du Pont's registered trademark for its fluorocarbon resins, including the tetrafluoroethylene resins discussed herein. This registered trademark should not be used as an adjective to describe any product, nor should it be used in whole, or in part, as a trademark for a product of another concern.

SEND FOR INFORMATION

For additional property and application data on Du Pont TEFLON tetrafluoroethylene resins, mail coupon.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept.
Room 49, Du Pont Building, Wilmington 98, Delaware

Please send me more information on Du Pont TEFLON tetrafluoroethylene resins. I am interested in evaluating these materials for_____

*Name*_____

*Company*_____ *Position*_____

*Street*_____

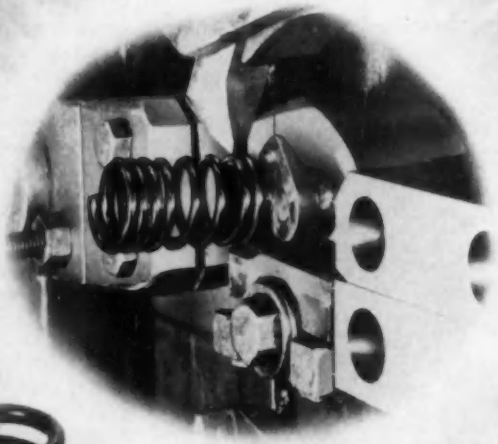
*City*_____ *State*_____

*Type of Business*_____

In Canada: Du Pont Company of Canada (1956) Limited, P. O. Box 660 Montreal, Quebec

PRECISION?
DEPENDABILITY?
it's Automatic!

QUALITY-CONTROLLED SPRINGS FOR YOUR PRODUCT





Engine Valve Spring as coiled

COILING

at Automatic is another outstanding example of the various precision operations that produce perfect springs for your product. Modern, high speed coilers in a complete range of sizes are arranged for continuous flow production. Every operator is equipped and trained to maintain uniformity and high quality.

During coiling alone, Automatic springs receive these seven quality-control tests.

1. **Tests for proper surface condition**
2. **Tests for diameter**
3. **Tests for free and solid height**
4. **Tests for loads at given heights**
5. **Tests for active and inactive coils**
6. **Tests for pitch or "lead"**
7. **Tests for uniformity.**



FREE!

Valuable booklet on how to specify and order springs. Send for it today

for quality springs "Automatically" think of

AUTOMATIC

SPRING COILING CO.

4048 West Thorndale Ave., Chicago 30, Ill.

servative estimates, but progress in these first stages is necessarily somewhat slow.

In a report to Secretary of Commerce Weeks, Federal Highway Administrator Tallamy reviewed the progress of the first year of the program. "We have progressed at a gratifying rate and we are on schedule," he said. Of course, in a year's time the advancement of such a tremendous program cannot be validly assessed in terms of earth moved, bridges built, or pavement laid. In the very early stages of a long-range program—lasting some 16 years — the best yardstick for measuring progress is the dollar yardstick.

"Nevertheless we can point to some very tangible results. On the National System of Interstate and Defense Highways, contracts were awarded for 561 projects involving construction of 1532 miles of the most modern type highways. At the same time contracts have been awarded for work on 24,000 miles of primary and secondary (farm-to-market) systems and their extensions into cities, all of which are essential to an expanding economy."

The Bureau of Public Roads had set a goal of $2225 million for fiscal 1957 for surveys and plans, acquisition of rights-of-way, and construction, said Mr. Tallamy. Actual obligations at the year's end totaled $2223 million, with $1383 million for the interstate system and $840 million for primary, secondary, and urban road improvements. He estimated that it would require about 16 years to complete the program.

Amounts obligated in the interstate highway system as of August 1, 1957, were as follows:

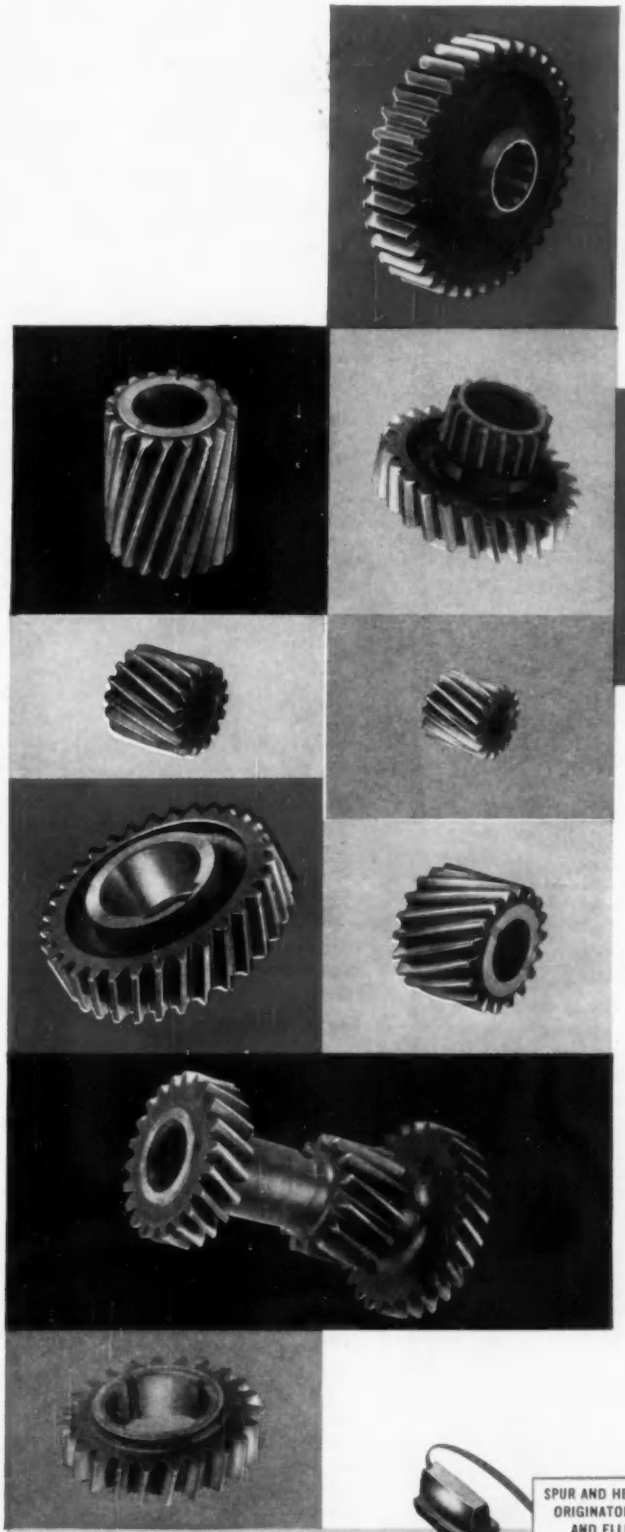
Preliminary engineering and right-of-way acquisition authorized, $748,692,223.

Federal share of this amount, $551,522,092.

Construction contracts advertised, 732 projects for 1987.4 miles, $1,045,815,065.

Federal share of this amount, $889,904,075.

Projects awarded to contract (included in contracts adver-



GEAR TOOTH NICKS and "HICKIES"

HONING IS, THE LOW-COST WAY OF SILENCING THEM

You can hone the average automotive transmission gear in from 15 to 60 seconds. This single operation gets rid of all the noisy nicks and hickies that are so troublesome and tedious to deal with in any other way.

But that's not all. Red Ring honing also improves over-all surface finish—down to 2-4 microinches if necessary.

The initial pass under the honing tool is an effective inspection procedure in that it immediately reveals any distortions that may exist in tooth profile, spacing and pitch diameter runout. When such distortions are not excessive, honing corrects them.

If you want to reduce the cost of silencing noisy gears (1″ to 12″ PD), write for Bulletin H 57-2.

SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING
AND ELLIPTOID TOOTH FORM

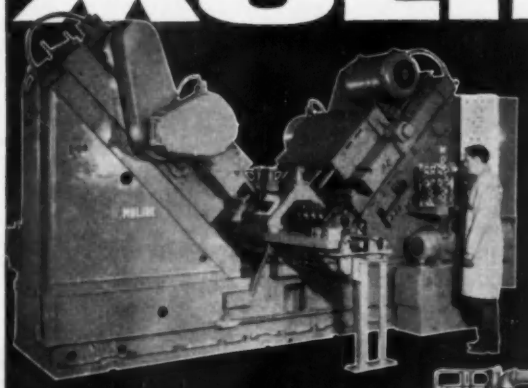
7810

NATIONAL BROACH & MACHINE CO.

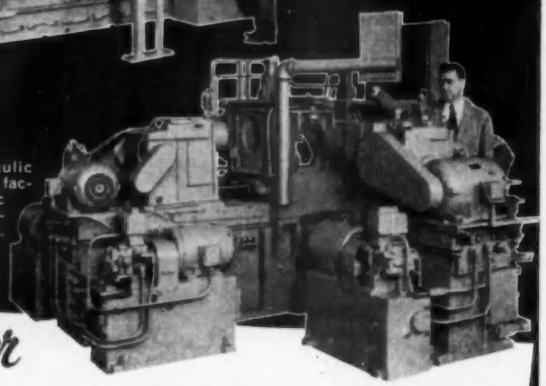
5600 ST. JEAN • DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

MOLINE



No. 13CB V-type cylinder boring unit is used either as an individual machine or as one of several automated units in a transfer line for boring automotive engine cylinders.



MR138 four-way, hydraulic feed, drilling, boring and facing machine with hydraulic clamping fixture for tractor main frame housings.

For Greater

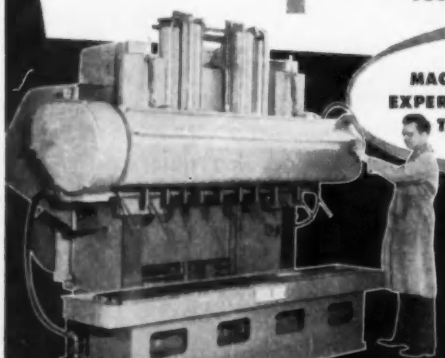
PRODUCTION . . . EFFICIENCY . . . SAVINGS

Use an individually designed "Hole-Hog" Machine Tool for such jobs as...

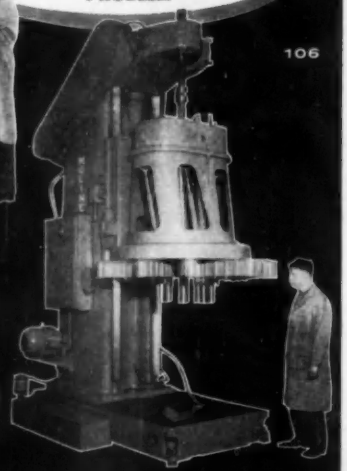
- Multi-Spindle Boring
- Single and Multi-Spindle Honing
- Straight Line Multi-Drilling
- Adjustable Spindle Drilling
- Vertical and Way-Type Fixed Center Drilling, Boring and Tapping
- Special Multiple Operation Machine Tools

OVER 55 YEARS OF MACHINE TOOL ENGINEERING EXPERIENCE IS AT YOUR SERVICE. TELL US YOUR PARTICULAR PROBLEM

106



HD67 hydraulic rail feed, straight-line type, multi-spindle drilling machine. Six-foot rail length as shown; also available in eight and ten-foot lengths.



No. 116-U hydraulic rail feed, universal joint type driller with 16 two-speed and neutral top drivers plus four-speed quick, change gear box. Spindles illustrated are 1½" drill capacity each in mild steel.

MOLINE TOOL CO. HOLE-HOG MOLINE, ILLINOIS

MOLINE TOOL COMPANY

REPRESENTATIVES IN PRINCIPAL CITIES

100 20TH STREET • MOLINE, ILLINOIS

tised), 636 projects for 1778.9 miles, $908,841,078.

Federal share of this amount, $774,677,816.

Something of what rising prices mean to the highway program is shown by price index changes during the past year. The price index is based upon highway construction costs as reported to the Bureau of Public Roads by state highway departments, and uses costs in 1946 as a base of 100 per cent. For the past year:

3rd	quarter,	1956	140.5
4th	"	1956	140.7
1st	"	1957	142.6
2nd	"	1957	142.7

From the low point of 125.15 in the 2nd quarter of 1955 to the latest compiled figure of 142.7 for the 2nd quarter of 1957, the increase was 13.7 per cent for the two-year period.

• • •

Opel and Vauxhall Slated To Go on Sale in September

Pontiac and Buick are franchising dealers in East Coast states to sell the imported Opel and Vauxhall small passenger cars, beginning in September or October.

Pontiac is holding contract talks with dealers in its Boston, Washington, New York, and Philadelphia zones, and hopes to have its first Vauxhall to sell by September 10. West Coast zones (Los Angeles, San Francisco, and Portland) will get their first shipment at a later date, since the cars will come all the way by water.

Buick is following a similar plan. Both divisions say that dealer interest in the European-made passenger cars is high, and a substantial rate of franchising is expected.

Ford Establishes New Records With Employment and Payroll

Ford Motor Co. set new employment and payroll records during the first half of 1957, with an average of 194,672 hourly and salaried employes, who earned a total of $599,685,328. The hourly wage averaged $105.30 for a 41.4-hour week, according to a Ford report.

The previous half-year employment high at Ford was 186,105, in the second six months of 1953. The payroll record was $588,225,159, set in the second half of 1956.



HOW R/M SETS THE PACE IN FRICTION MATERIAL DEVELOPMENT

R/M alone manufactures all types of friction materials

Particularly with today's more complex requirements, no single type of friction material can be best for all friction applications. That's why Raybestos-Manhattan, for over 50 years the world's leading maker of friction materials, is in a unique position to help you.

Where asbestos is most practical, R/M experience can determine precisely whether woven or molded asbestos parts—or both together—will give you better results.

Where high temperatures, close tolerances, or rapid repetitive engagement is a factor, R/M sintered metals may best meet your requirements. If excessive heat is not a problem, R/M cork-cellulose parts may give top performance. And where greater heat resistance is required, Raybestos-Manhattan semi-metallic friction materials are widely used.

Unlike other manufacturers, R/M works with *all* kinds of friction materials. Thus, whatever your friction requirements may be—whatever the application—you can be sure of a completely unbiased recommendation when you consult an R/M engineer.

Remember, all the depth and breadth of R/M experience—the complete facilities of R/M's seven great plants, with their research and testing laboratories—are as near as your telephone.



Write now for your free copy of R/M Bulletin No. 500. Its 44 pages are loaded with practical design and engineering data on all R/M friction materials.

RM
FIRST IN FRICTION

THE TRADEMARK THAT SPELLS PROGRESS
IN FRICTION MATERIAL DEVELOPMENT

RAYBESTOS - MANHATTAN, INC.

EQUIPMENT SALES DIVISION: Bridgeport, Conn. • Chicago 31 • Cleveland 16 • Detroit 2 • Los Angeles 58

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; Passaic, N.J.; No. Charleston, S.C.; Crawfordsville, Ind.; Neenah, Wis., Raybestos-Manhattan (Canada) Limited, Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Brake Linings • Brake Blocks • Clutch Facings • Sintered Metal Products • Industrial Adhesives Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics • Rubber Covered Equipment Abrasive and Diamond Wheels • Laundry Pads and Covers • Bowling Balls

SPECIALIZED EQUIPMENT

(*Continued from page* 176)

features. One is an interlock that keeps the circuit broken after an overload until the condition causing the trouble has been corrected and a manual reset button has been pressed to restart the motor. The circuit will not close otherwise, even if the contacts of the meter-relay unlock for any reason, such as an external blow or bump.

The other safety feature is "fail-safe" circuitry, in which the load relay is energized when the control is operating. Overload causes the relay to drop out and break the circuit through the motor. Similarly, any other abnormal condition, even failure of parts within the control, will short out the load relay.

Upon request, the Load Sentry will be mounted by the manufacturer in N.E.M.A. 12 housings.

Circle 197 on postcard for more data

BIG HARDENED & GROUND PARTS?



Look at the work WE HANDLE!

Here is an intricately formed tapered pin for off-road equipment. It weighs 40 pounds. Starting with heat treated 4" bar stock, three different tapers are turned, with all diameters ground concentric. Ends are hob-threaded, and one end drilled and tapped. Final operation is the cadmium plating of bottom taper.

Mass production of such difficult parts as this is our specialty. Behind it is 40 year's experience in metallurgical engineering, precision grinding and uniform quality control.

For information, send a wire, letter or print. We'd welcome one of your toughest problems.

Henry W. Brown
PRESIDENT

Experienced production on: King Pins • Wheel Studs Shackle Bolts • Shackle Pins • Brake Anchor Bolts Countershafts • Idler Shafts • Stub Axle Shafts • Steering Ball Bolts • 5th-Wheel Rocker Shafts • Water Pump Shafts . . . anything in the hardened and ground line, of any analysis steel, up to 4¼" diameter.

THE BROWN CORP.

213 BELLEVUE AVE. SYRACUSE, N.Y.

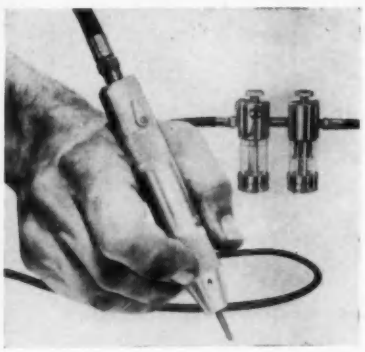
C. H. Ehlert, 3407 Clarendon Rd., Cleveland . . . Leigh-Patterson, 152 W. Pico Blvd., Los Angeles
R. G. Sanderson, 2342 N. Cicero Ave., Chicago . . . Harry J. Windmiller, 1704 Carlton, Fort Worth
John B. Hunt, 5611 S.E. Yamhill St., Portland, Ore. . . . N. F. Spring, 4716 Balfour Rd., Detroit
B. C. Grant, 108 Fayette Drive, Fayetteville, N. Y.

THOR POWER TOOL CO.

POWER TOOLS — Portable electric screwdriver-nutsetter tools, with 19 engineering improvements, have been introduced in the No. 10 screw or nut capacity class. The new Silver Line EB series units feature weight and size reductions up to 25 per cent and offer 100 per cent more power than the UL series tools they replace. Available with bonnet toggle or lever switches, they come in speeds of 500, 1000, 1500 and 2500 rpm. Attachment types include adjustable double slip and Uni-Tork clutches for precision torque assembly work. Straight or right-angle attachments are obtainable with the double slip types, with option of either screwdriving or nut-setting equipment.

Circle 198 on postcard for more data

THE BELLOWS CO.



AIR-POWERED GRINDER — Designated Model GA-125, this pencil-size grinder reportedly operates at 100,000 rpm on 80-psi air line pressure. Uses include grinding, deburring, cutting, polishing, and die and mold finishing. The turbine type rotor is said to float on a cushion of air, virtually eliminating bearing wear. It comes equipped with a filter-lubricator and six feet of nylon-reinforced hose.

Circle 199 on postcard for more data

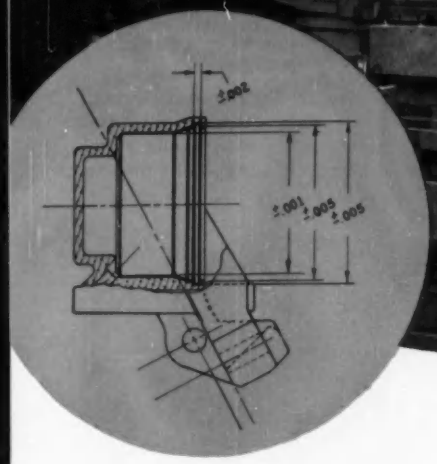
FORMSPRAG CO.

BACKSTOP CLUTCHES—Large-bore over-running clutches in an expanded line of six sizes incorporate added refinements. Known as the Models FS-1100, FS-1150, FS-1200, FS-1250, FS-1300 and FS-1400, the sealed double ball-bearing clutches to combine compact size and lighter weight with greatly increased torque capacity. They replace the previous four models.

The new models are available in maximum-bore sizes from 6 to 12 in., with torque capacities from 18,500

(*Turn to page* 204, *please*)

New OLOFSSON Special



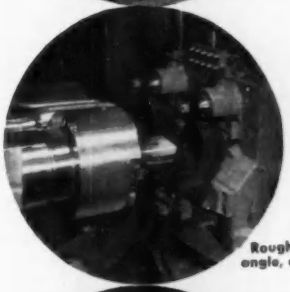
Boosts Production of Rear Band Servos

This new OLOFSSON Special, Three Station, Two Way Precision Boring Machine performs multiple operations on rear band servos in the plant of a leading automobile manufacturer.

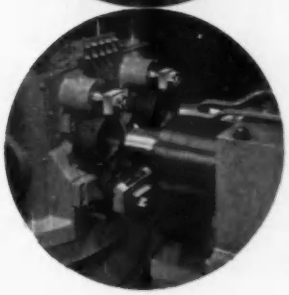
In the three stations shown at right, the machine rough bores, forms angle, grooves, and finish bores. Production is 220 pieces per hour.



STATION 1
Load and unload two parts.



STATION 2
Rough bore, form angle, and groove.



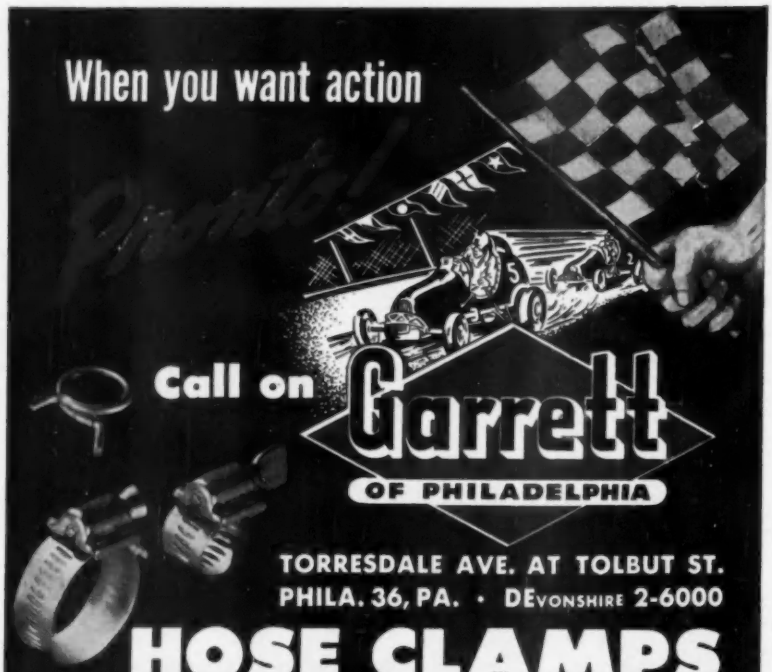
STATION 3
Finish bore.

For "*Profit-Making*" Special Machinery designed to lower your production costs, consult OLOFSSON. You'll find it pays! Phone IVanhoe 4-5381, or write . . .

THE OLOFSSON CORPORATION
2730 Lyons Avenue Lansing, Michigan

Manufacturers of **PRECISION BORING MACHINERY AND SPECIAL MACHINERY**

When you want action



Call on Garrett
OF PHILADELPHIA

TORRESDALE AVE. AT TOLBUT ST.
PHILA. 36, PA. • DEVONSHIRE 2-6000

HOSE CLAMPS



You can't beat Garrett for delivery on Hose Clamps. Our standard sizes of MULTI-CLAMPS, the clamp of 1,000 high pressure uses . . . AUTO-SEAL, the economy clamp for every industrial use . . . and SPRING-GRIP, the speedy, low-cost wire clamp . . . run the full length of industry's needs—and we can make immediate delivery regardless of quantity. Garrett STATISTICAL QUALITY CONTROL is your assurance of "Double Quality" precision products.

Depend on GARRETT for all small parts.

FLAT WASHERS—Made to meet new ASA and SAE standards . . . available in steel, brass, bronze, monel, aluminum, and stainless steel . . . finished to your specifications.

HELICAL SPRING LOCK WASHERS—with controlled tension for tighter assemblies.

SPRING WASHERS—Belleville, Bevel, 3-Wave, 4-Wave and other Spring Washers of special design.

METAL STAMPINGS—Made to your specifications on high-speed production presses.

SEND FOR LITERATURE

GEO. K. GARRETT CO.
TORRESDALE AVE. AT TOLBUT STREET, PHILA. 36, PA.

Please send, without obligation, literature on the following:

☐ FLAT WASHERS
☐ HELICAL SPRING LOCK WASHERS
☐ SPRING WASHERS
☐ HOSE CLAMPS
☐ STAMPINGS
☐ GARRETT STATISTICAL QUALITY CONTROL

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Key No. AI-7

SPECIALIZED EQUIPMENT

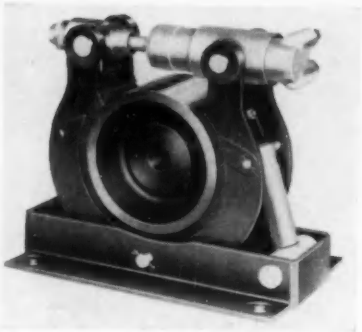
(*Continued from page* 202)

to 136,500 lb-ft. All have sprags individually energized by pairs of springs for reliability, ball-bearing construction for smooth operation and long life, mechanical seals to prevent entry of abrasive material, and grease lubrication.

Circle 200 on postcard for more data

WAGNER ELECTRIC CORP.

HYDRAULIC BRAKE—Designed to provide smooth service braking and accurate load spotting control on light industrial cranes, a new 6 by 3-in. hydraulic brake is also suited to other applications, such as tension



Wagner 6 by 3-in. hydraulic brake

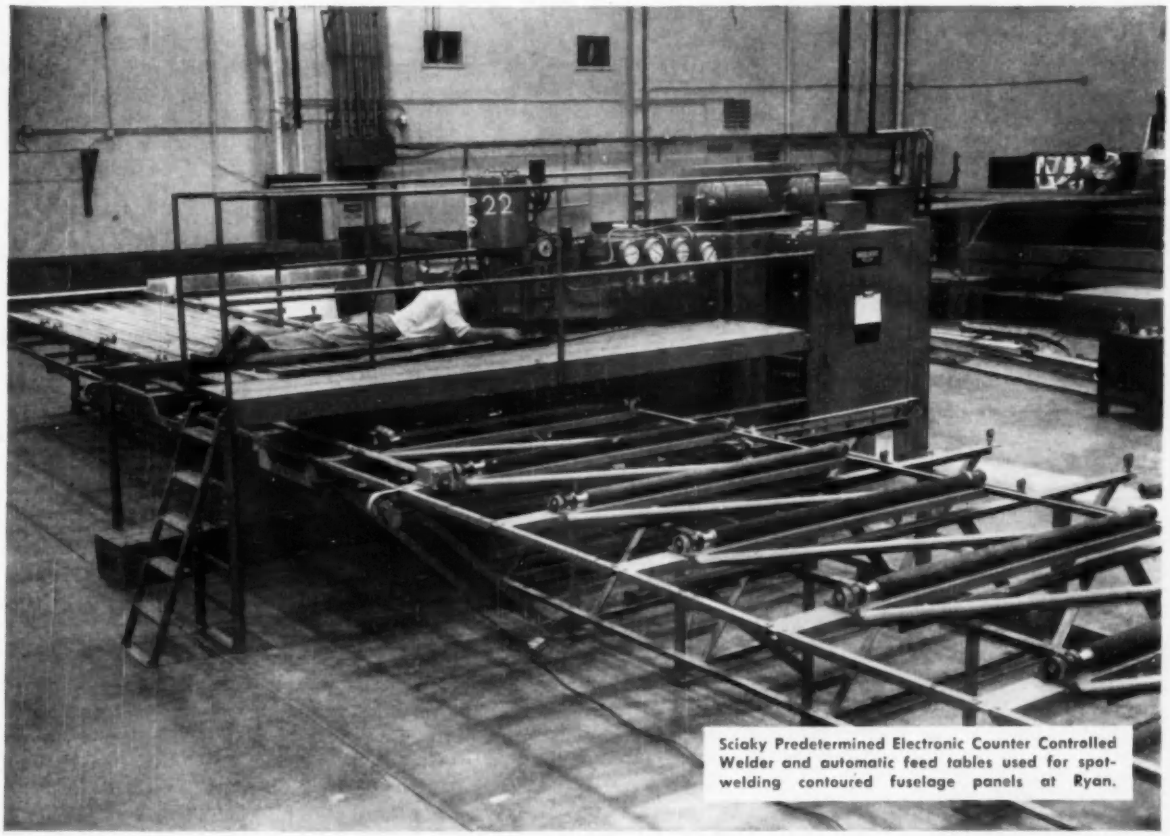
control on mill roll stands and emergency stopping, holding and service braking on machines and devices. The standard brake is designed for use with hydraulic brake fluid only; if specified, it can be furnished with mineral-oil-compatible parts for special fluid power-holding operations. The brake is also available as a combination service and parking brake which provides automatic emergency braking in the event of power failure.

Circle 201 on postcard for more data

SUPERIOR PNEUMATIC AND MFG., INC.

SMALL AIR HAMMER—Measuring only six in. long and weighing 20 oz, an air hammer can be operated with one hand, leaving the other free to handle the work. Called the Bantam Bully, its metering trigger lets the operator control blows per minute from 0 to 13,000. Air consumption is

(*Turn to page* 208, *please*)



Sciaky Predetermined Electronic Counter Controlled Welder and automatic feed tables used for spot-welding contoured fuselage panels at Ryan.

COMPLEX SPOTWELDING PROGRAM AT RYAN IS SEVERE TEST FOR NEW SCIAKY COUNTER CONTROL

Ryan Aeronautical Company, San Diego, California has achieved a significant first in resistance welding—automatic spot welding of large contoured fuselage panels for the Boeing KC-135 and "707" Jets.

Referring to their new Sciaky Counter Controlled Welder, Mr. Bob Fullerton, Ryan's Senior Welding Engineer, stated, *"This is one new welding development that really does what the advance announcements promised."*

PRECISE CONTROL

Early in the program, it became obvious that precise control of all welder functions and absolute production consistency of welding was essential. Introduction of the new Predetermined Electronic Counter Controlled Welder by Sciaky helped solve this problem.

Here, for the first time, is a welder in which functions are controlled to a fraction of a cycle of alternating current. Control settings are realized with exactness. The unvarying accuracy of counting is maintained throughout the entire range for the longest run at the highest production rate. Any production control setting is readily reproducible at any time.

CONSISTENT, SAFE WELDS

The consistently safe welds produced by the Sciaky Counter Weld Control are essential to the Ryan program since the skin is a load-bearing member. In addition, the size of the assembly—largest every sub-contracted in the industry—will not tolerate even the possibility of rejects due to imperfect welds.

The importance of consistently perfect welds is emphasized by the tremendous number of spotwelds in the aft fuselage sections of the Boeing jet tanker-transports. Approximately 77,000 spot welds are required to join skins to skins, skins to doublers and stringers, and bulkhead components together.

TAPE COMMAND OF WELDING OPERATIONS

Welding operations on the various assemblies can be controlled by a tape command unit providing complete piece part positioning in all directions. Automatic interlock between positioner and welder is required. This would provide more automatic operation.

COMPLEX TOOL-UP

Handling and positioning the aluminum skins also presented a major problem. Ryan solved this by installing huge positioning tables with push button controls to permit automatic feeding.

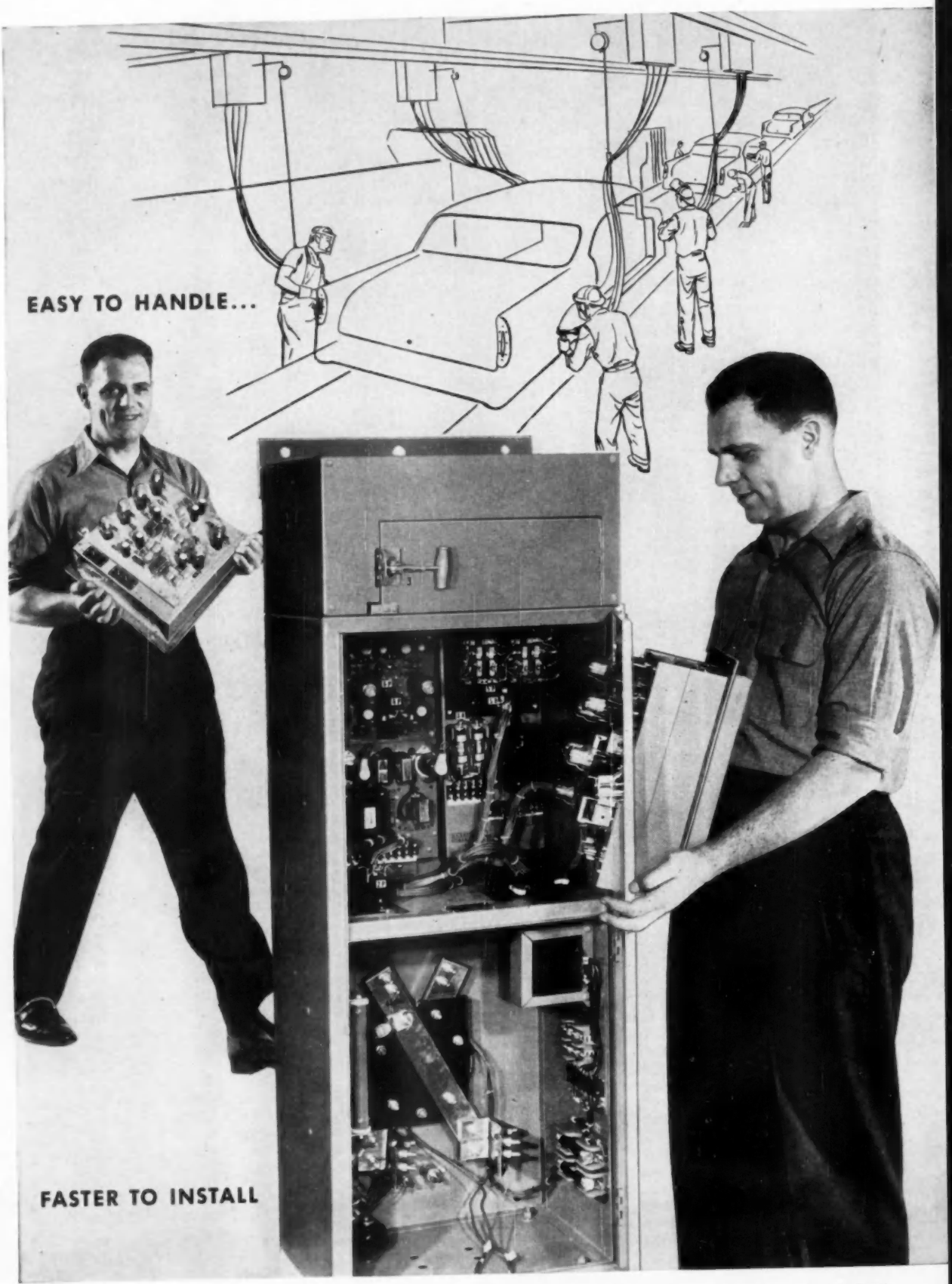
The characteristics and consistent operation of the Sciaky Counter Controlled Welder combine perfectly with the automatic abilities and consistency of the Ryan positioning table to satisfy the requirements of this complex production assembling operation.

LITERATURE AVAILABLE

Technical bulletins completely describing the new Sciaky Predetermined Electronic Counter Weld Control are available. Write on your company letterhead requesting Bulletins 338 and 339.

SCIAKY® *Helps Put Profit Into Manufacturing*

Sciaky Bros., Inc., 4925 West 67th St., Chicago 38, Ill., Portsmouth 7-5600


EASY TO HANDLE...
FASTER TO INSTALL

Westinghouse Weld-O-Timers with plug-in panels keep down-time down

Plug-in replacement of Westinghouse Weld-O-Timer* control panels cuts down-time, keeps production lines rolling. Three minutes is all it takes for full installation—putting in place and plugging in the weld sequence timer panel, the heat-control panel and the relays.

New printed-circuit construction of both panels reduces weight by 30%... makes panels easier to handle, faster to install. Printed circuits replace 27 feet of wiring in the two panels... positively binding circuits and components.

The new Westinghouse Weld-O-Timer—industry's most advanced resistance welding control—combines proved record-breaking performance with better-than-ever dependability. For the complete Weld-O-Timer story, call your local Westinghouse representative today . . . or write Westinghouse Electric Corporation, P. O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

*Trade-Mark

J-22009

YOU CAN BE SURE... IF IT'S

Westinghouse



Snap-on Ignitron tube thermostat improves welder efficiency, protects against high operating heat by locking out current in the event of dangerous heat build-up.

SPECIALIZED EQUIPMENT

(*Continued from page* 204)

6.5 cmf at 90 psi. Twenty-four different tools for scaling, chiseling, peening, cutting, star drilling, etc. are available for use with the unit. A slip chuck snaps the various tools in or out easily and can be locked in eight different positions.

Circle 202 on postcard for more data

VICKERS, INC.

PRESSURE-REDUCING VALVES—Two low-pressure type pressure-reducing valves feature broad pressure adjustment range, being capable of supplying a controlled reduced outlet pressure from 25 to 1000 psi. They are primarily intended for applications in industrial oil-hydraulic systems to provide, for secondary circuits, a controlled maximum operating pressure.

Both new valves are for use with ⅜-in. nominal pipe size, in systems having operating pressures up to 2000 psi. Model XGL-03-B is a gasket-mounted design; Model XTL-03-B is provided with ⅜-in. pipe thread connections. Operation of these valves is such that reduced outlet pressure is maintained essentially constant, regardless of inlet pressure variations above the selected setting.



Vickers Model XTL-03-B pressure-reducing valve for oil-hydraulic systems

Both models are nominally rated at eight gpm flow capacity. Free reverse flow is allowable, provided pressure at the reduced pressure port does not exceed the reduced pressure setting of the valve. Bleed control flow is approximately 35 cim.

Circle 203 on postcard for more data

CRATEX MANUFACTURING CO.

WHEEL DRESSING—Dressing and cleaning of metal-bonded diamond wheels is facilitated by a new method. Using Cratex (rubberized abrasive) blocks, a fast and effective job of removing smear metal and clogging from diamond wheels is achieved. Because of its cushioning action, the block flows around the diamond particles and cleans away the smear metal with minimum danger of knocking the diamond particles loose. The diamond wheel is thus quickly restored to its maximum cutting action and the life of the wheel increased.

Circle 204 on postcard for more data

CHICAGO PNEUMATIC TOOL CO.

BROACH PULLERS—To meet the needs for finishing holes in aircraft structures to tolerances as close as ±0.0005-in., two tools have been developed identified as CP-658 and CP-659 Pneudraulic portable broach pullers.

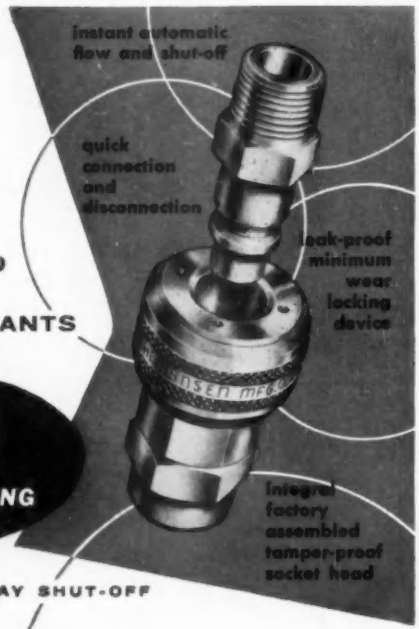
The pullers are powered by a CP-805-ARDR Pneudraulic power unit

(*Turn to page* 211, *please*)

Thoroughly Proved...

BY YEARS OF HARD EVERYDAY USE IN THOUSANDS OF PLANTS

HANSEN
QUICK-CONNECTIVE
PUSH-TITE COUPLING





ONE-WAY SHUT-OFF

Locking pins in Hansen Push-Tite Coupling Socket afford large area contact with Plug, thereby preventing wear and subsequent leakage.

The ability of Hansen Push-Tite Couplings to withstand severe service—with practically no maintenance—has been thoroughly proved by years of hard, everyday use in thousands of plants. The "socket head", which contains the locking device, is factory assembled into a rugged integral unit which cannot be readily injured or have component parts lost by casual tampering.

To connect the Coupling, you merely push the Plug into the Socket with one hand. Flow is instantaneous. To disconnect, push back sleeve on Socket—Coupling disconnects. Flow is shut off instantly and automatically.

QUICK-CONNECTIVE FLUID LINE COUPLINGS for
AIR • OIL • GREASE
HYDRAULIC FLUIDS • WATER
VACUUM • STEAM • OXYGEN
ACETYLENE • REFRIGERANTS
GASOLINE • COOLANTS

WRITE FOR THE HANSEN CATALOG

Here's an always ready reference when you want information on couplings in a hurry. Lists complete range of sizes and types of Hansen Quick-Connective Couplings. Write for your copy.



Representatives in Principal Cities

SINCE 1915

QUICK-CONNECTIVE FLUID LINE COUPLINGS

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

AIRESEARCH TURBOCHARGERS ANSWER "YES!" TO...



increased power?

Your engine's output can be raised up to 100%, depending on its design and application. Incorporating the most efficient turbine wheels in the industry, AiResearch turbochargers can give sea-level performance up to 12,000 feet.

lower specific fuel consumption?

The turbocharger improves engine combustion, resulting in important fuel saving per horsepower even with greatly increased engine power output.

lower engine thermal loading?

Efficient compressor wheel design holds heat-producing turbulence to a minimum, providing a smooth flow of compressed air to the engine. AiResearch turbochargers are also air-cooled, eliminating the need for complicated plumbing.

less noise and smoke?

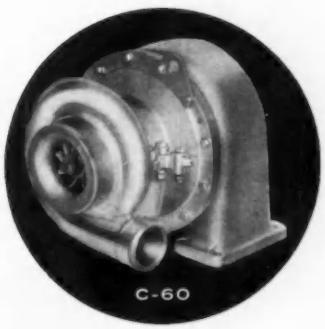
Engine noise level is greatly decreased. Smoking is often completely eliminated.

reliability and durability?

Excellent reports on more than 13,000 AiResearch units at work in the field emphasize these qualities. AiResearch turbochargers require no attention between normal engine overhaul periods.

Your inquiries are invited.

BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS					
MODEL	F-51	C-60	A-60	E-100	B-100
Output — lb/min. (Standard Conditions)	29-51	30-60	38-60	50-100	60-100
Diameter — in. nom.	10.0	11.5	15.25	15.1	15.4
Length — in.	10.5	12.9	16.75	14.7	17.1
Weight — lb.	40.0	95.0	125.0	112.0	135.0



THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

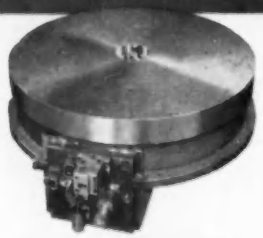


THIRTEEN STATION AUTOMATIC TRANSFER MACHINE

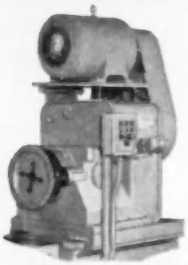
— mills, drills, reams, spotfaces, taps and saws apart cast iron bearing cap blocks. Machine includes 5 standard feed slides, 9 standard production units.

Because major components are standardized

KEARNEY & TRECKER TAKES THE "SPECIAL COSTS" OUT OF PRODUCTION MACHINE TOOLS



STANDARD ROTARY INDEX TABLE available in 4 different table diameters, any practical number of indexes.



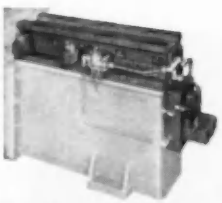
STANDARD MILLING HEAD UNIT 4 sizes. Single spindle . . . various horsepower and speed ranges . . . single or double reduction drive . . . automatic quill retraction. Any size can be modified for boring.

Here's a sound, proven *economical* approach to your production machine tool problems . . . Kearney & Trecker production machine tools featuring standardized components.

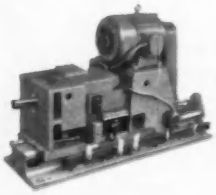
You get IMPORTANT SAVINGS—benefit directly three ways: (1) lower initial cost; (2) less lead time needed and (3) proven standard units mean efficiency *plus* simplified machine maintenance.

Ask the Kearney & Trecker man—he'll show you more examples of standardized machine components in production machine tools — the keys to capturing more profits from production!

Kearney & Trecker Corp.
6774 W. National Avenue, Milwaukee 14, Wis.

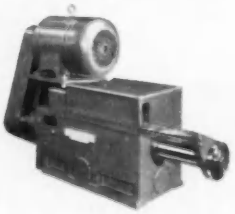


STANDARD FEED SLIDE UNIT provides hydraulic feed for milling, boring or drilling heads. Available in 4 sizes and in various length cylinder strokes.



STANDARD WAY TYPE DRILL UNIT for drilling, boring, reaming, counter-boring and chamfering. Single and multiple spindle arrangements, single or double feed rates.

ASK FOR FREE KEARNEY & TRECKER Production Machine Tools Bulletin SMD-57. It provides full standard component details — and their application to production machine tools.



STANDARD QUILL FEED UNIT for drilling, boring, reaming, spotfacing, counter-boring and chamfering. Single or multiple spindle arrangements — single or double feed rates.

KEARNEY & TRECKER MILWAUKEE

Designers and Builders of Precision and Production Machine Tools Since 1898

ATLANTA, GA.
Scott Machine Tool Co.
411 Williams St., N.W.

BIRMINGHAM, ALA.
George M. Meriwether
Industrial Equipment
1712 Seventh Ave. North

BOSTON, MASS.
Stedfast & Roulston, Inc.
11 Deerfield St.

BUFFALO 23, N.Y.
Syracuse Supply Co.
1965 Sheridan Drive

CHARLESTON, W. VA.
Wm. S. Bolden Co., Inc.
MacCorkle Ave.

CHATTANOOGA, TENN.
Scott Machine Tool Co.

CHICAGO, ILL.
Jackson-Fotsch Co.
7350 West Lawrence Ave.

CINCINNATI, O.
The E. A. Kinsey Co.
327-335 W. Fourth St.

NEW YORK, N. Y.
Kearney & Trecker Corp.
409 Grand Ave.
Englewood, New Jersey

NEW ORLEANS, LA.
Stauss & Haas, Inc.
524 Camp St.

OMAHA, NEB.
Fuchs Mach. & Supply Co.
2401 N. Eleventh St.

PHILADELPHIA, PENN.
Machinery Assoc., Inc.
325 E. Lancaster Ave.
Wynnewood, Penna.

PITTSBURGH, PENN.
Kearney & Trecker Corp.
4 West Manilla Ave.

PORTLAND, ORE.
Harry M. Euler Co.
2811 N.E. Gilsan St.

RICHMOND, VA.
Smith-Courtney Co.
Seventh & Bainbridge Sts.

For details, contact these

KEARNEY & TRECKER DISTRIBUTORS

or write to

KEARNEY & TRECKER CORP.

6774 W. National Ave., Milwaukee 14, Wis.

CLEVELAND, O.
Kearney & Trecker Corp.
Euclid Ave. & E. 17th St.

COLUMBUS, O.
The E. A. Kinsey Co.
1020 W. Fifth St.

DALLAS, TEX.
Greene Machinery Co.
6300 Wyche Blvd.

DAYTON, O.
The E.A. Kinsey Co.
16 Washington St.

DENVER, COLO.
F. J. Leonard Co.
1219 California St.

DETROIT, MICH.
Kearney & Trecker Corp.
10600 Puritan Ave.

GREENSBORO, N. C.
Smith-Courtney Co.
239 S. Davie St.

HICKORY, N. C.
Smith-Courtney Co.
103 3rd Street, S.W.

HOUSTON, TEX.
Steel & Machine Tool Sales
6414 Navigation Blvd.

INDIANAPOLIS, IND.
The E. A. Kinsey Co.
1550 Stadium Drive

KANSAS CITY, MO.
Blackman & Nuetzel
Machinery Co.
1103 E. Armour Blvd.

LOS ANGELES, CALIF.
Moore Machinery Co.
3200 S. Garfield Ave.

MILWAUKEE, WIS.
Kearney & Trecker Corp.
6784 W. National Ave.

ROCHESTER 4, N. Y.
Syracuse Supply Co.
311 Alexander Street

ST. LOUIS, MO.
Blackman & Nuetzel
Machinery Co.
3713 Washington Ave.

ST. PAUL, MINN.
Sales Serv. Mach. Tool Co.
2363 University Ave.

SALT LAKE CITY, UTAH
Todd Machinery Co.
4165 Holloway Drive

SAN FRANCISCO, CAL.
Moore Machinery Co.
7th & Carleton-Berkeley

SAN JOSE, CALIF.
Moore Machinery Co.
656 Stockton Ave.

SEATTLE, WASH.
Dawson Mach. Co.
5700 First Ave., S.

SHREVEPORT, LA.
Peerless Supply Co., Inc.
701 Spring St.

SYRACUSE 1, N. Y.
Syracuse Supply Co.
314-332 W. Fayette St.

TULSA, OKLA.
White Star Mach. Co.
104 Boulder Bldg.
19 West 10th Street

WICHITA, KAN.
White Star Mach. Co.
301 N. St. Francis

CANADA
MONTREAL
OTTAWA
QUEBEC
TORONTO
WINDSOR
Williams & Wilson Ltd.



SPECIALIZED EQUIPMENT

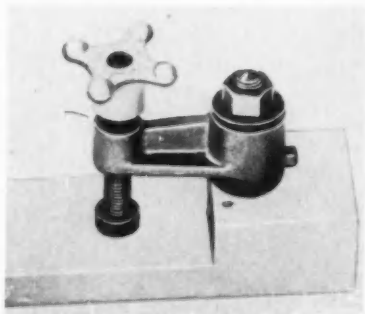
(*Continued from page* 208)

which requires a 90 psi air supply. The broach is inserted in the drilled hole from the rear and the tool nose placed over the broach shank. Squeezing the tool trigger admits a controlled supply of high-pressure oil from the power unit to the tool cylinder; automatically closing the chuck on the broach shank and pulling the broach through the hole. A stream of air continually cleans chips from the broach. This one pass of the broach produces a clean accurate hole. Air pressure returns the piston to forward position, where the chuck automatically opens and the broach is removed for the next operation.

Circle 205 on postcard for more data

JERGENS TOOL SPECIALTY CO.

REVOLVING CLAMP—A revolving clamp assembly incorporates a detachable, springlock revolving shoe on a knob screw for positive workholding on uneven clamp-down. Used



Jergens revolving clamp assembly

for holding down work to be drilled or milled, the clamp assembly will operate with either left- or right-hand swing. It is made of malleable casting tumbled smooth, and is designed to quickly swing clear of work and fixture. Available in three sizes of 1½, 3 and 4 in., each assembly is applied by drilling and tapping one hole.

Circle 206 on postcard for more data

LINK-BELT CO.

SHEAR-PIN SPROCKETS — Roller chain shear pin sprockets are available for preventing damage to equipment from jamming and other overloads. The shear pin hub is keyed to the shaft and is separate from the sprocket, with torque transmitted from sprocket to hub by a shear pin. When an overload occurs, the necked pin shears at a predetermined value and disconnects sprocket and hub.

Circle 207 on postcard for more data

JOSEPH T. RYERSON & SON, INC.

PROCESSED STEEL PLATE — E-Z-Cut steel plate is a new leaded steel, suited for making die bases, jigs, molds, and other products in which considerable machining is involved.

The mechanized flame-cutting equipment with the electronic eye tracer permits faster, more accurate and more intricate sketch burning.

Circle 208 on postcard for more data

(*Turn to page* 215, *please*)

Classified Advertisements

AUTOMOTIVE EXHAUST SYSTEMS, the Atlanta, Ga., area. (Retl & whlse sales & svce.) Ideal cor. site w/hi poten in ar! Self-opera in shop eqpt 4 incr. vol! Grosses over $22,000! Brochure on req. Ref. B 9121.

PAINT & BODY SHOP, NW South C. R.E. w/low taxes, & 90% cash bus. netting $8,000 ea. yr! Owner relocate. Details on req. Ref. B 9180.

RADIATOR DISTRIB. W. Cen. Ariz. (Also ret. sales & svce.) Nets over $8,000 w/expansion oppty in whlse! Write for details. Ref. B 24368.

AUTO PARTS, Whlse & Retl, W. Cen. Calif. Val. R.E.! A-1 eqpt. & xlnt loc. for contin. accts! Est. '37 w/expan oppty in mchne shop. Self-opera; nets $15,700! Write for detailed brochure. Ref. B 24382.

RETL & WHLSE AUTO PARTS, S. Cen. N. Y. Annual sales equal ask pr. Nets $11,000. Compl. fac. Est '18. Xcptnl accts & A-1 reputa. Write for details. Ref. B 42651.

BUSINESS MART OF AMERICA, 6425 Hollywood Blvd., Los Angeles, Calif.

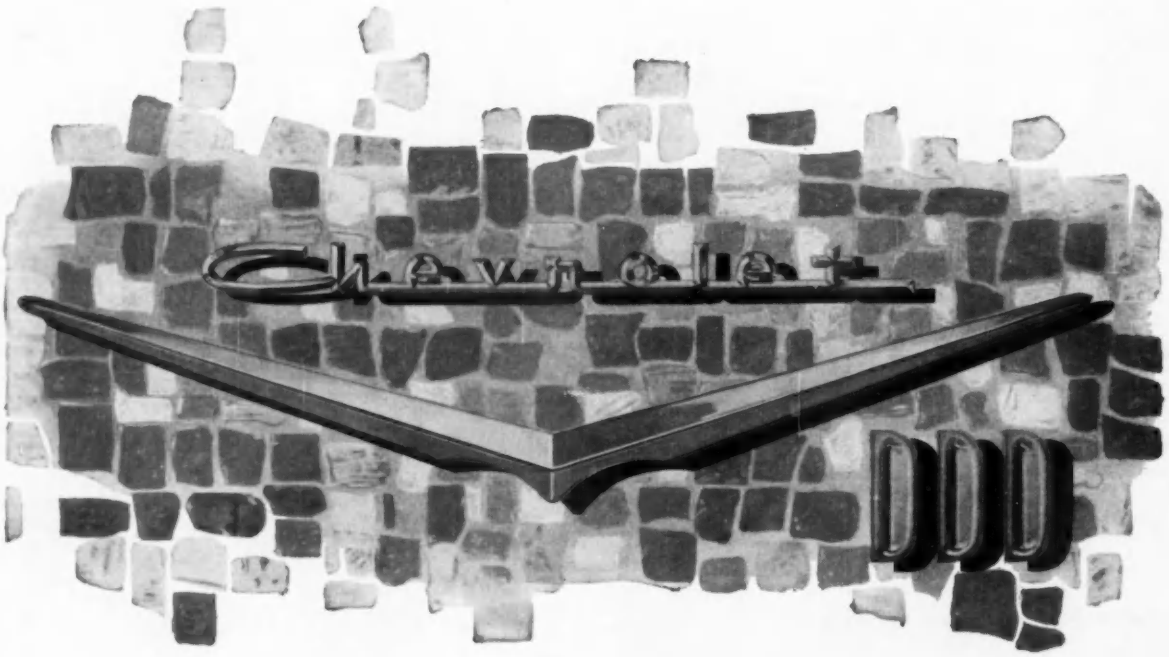
Buy Bonds

From Thompson Industries Inc.: the appeal of COLOR

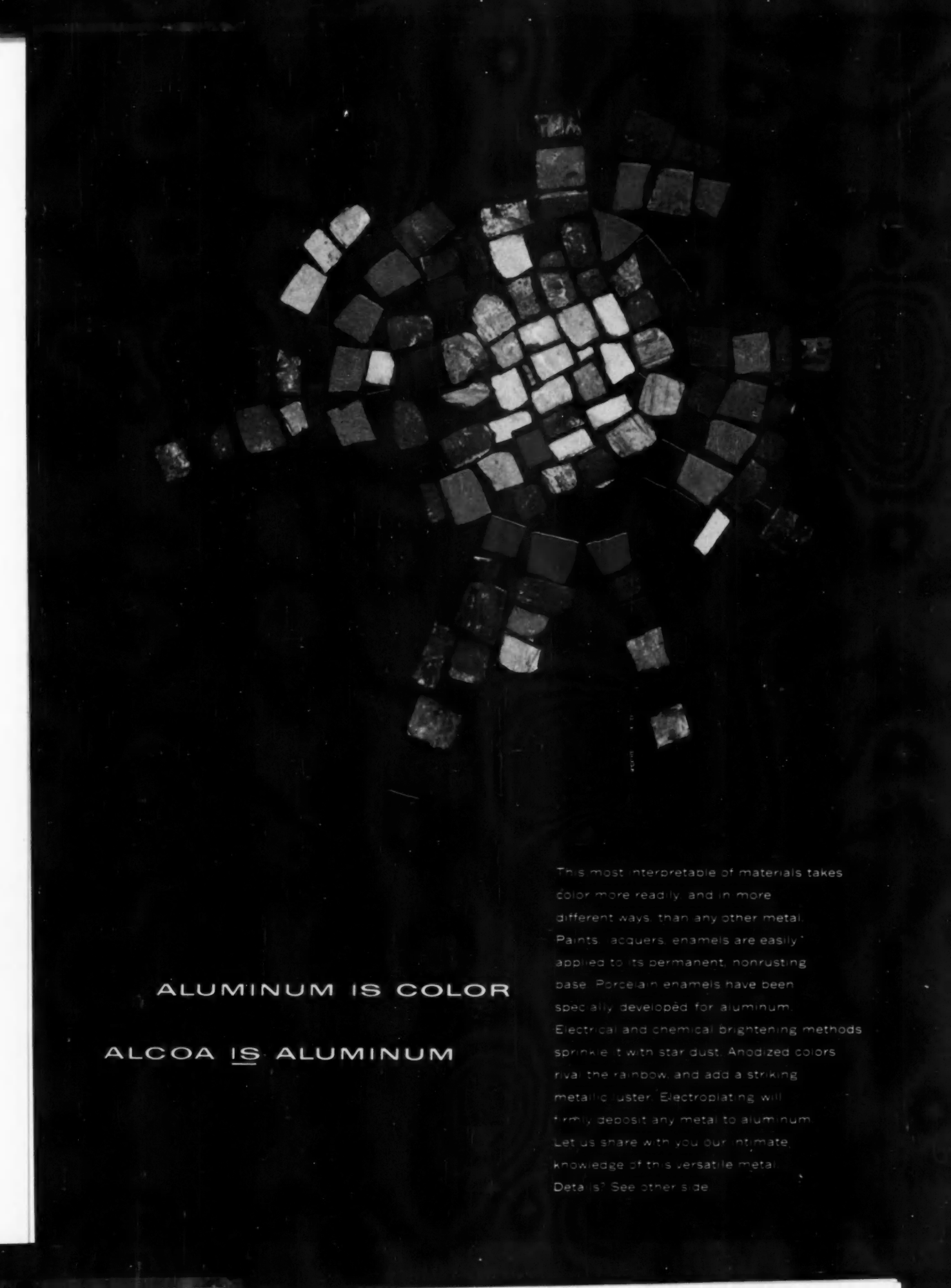
Of all the colors that whet man's appetite for splendor, the color of gold is perhaps the most compelling. The automobile jewelry below is fashioned from Alcoa® Aluminum by Thompson Industries, Inc., Detroit, Michigan, who supervise its anodic transformation to a rich and gleaming gold.

Expert fabricators of aluminum like Thompson Industries offer anodized aluminum in a range of gleaming colors and finishes, which sales-minded automakers will soon be using to attract the discriminating buyer. For, no other metal has aluminum's great receptivity to color and finish, and its consequent ability to enchant.

The skills and resources of Alcoa, which in itself does not fabricate automobile trim, are heavily utilized by the creative suppliers, like Thompson Industries, with whom we do business. This teamwork has paid off . . . in fruitful new developments, in automotive products of the highest quality.



ALCOA ALUMINUM gives every car more **GLEAM AND GO**



ALUMINUM IS COLOR

ALCOA IS ALUMINUM

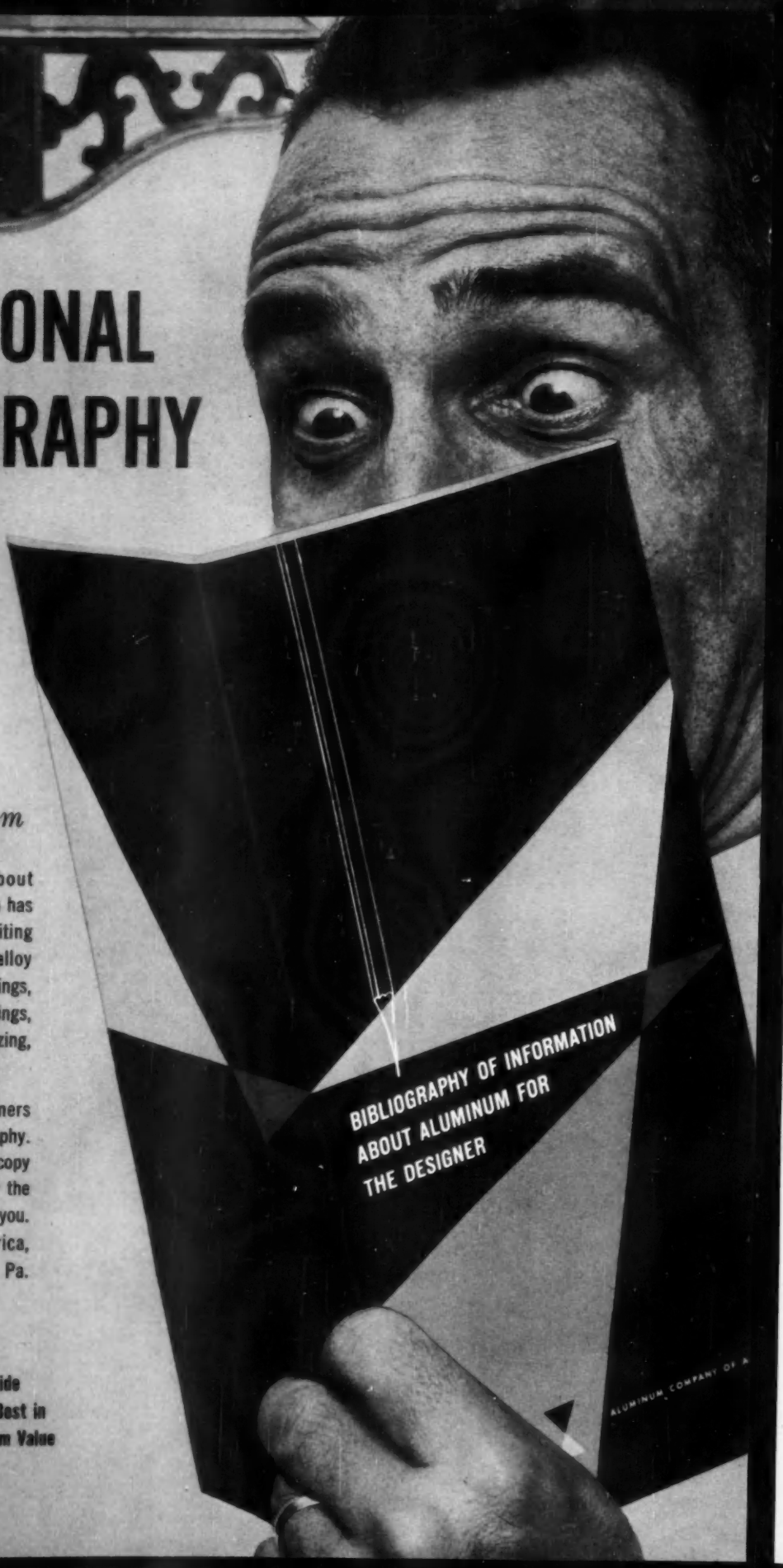
This most interpretable of materials takes color more readily, and in more different ways, than any other metal. Paints, lacquers, enamels are easily applied to its permanent, nonrusting base. Porcelain enamels have been specially developed for aluminum. Electrical and chemical brightening methods sprinkle it with star dust. Anodized colors rival the rainbow, and add a striking metallic luster. Electroplating will firmly deposit any metal to aluminum. Let us share with you our intimate knowledge of this versatile metal. Details? See other side.

INSPIRATIONAL BIBLIOGRAPHY FROM ALCOA

FREE! *Describes Alcoa books and films to help you design in aluminum*

A treasure chest of information about aluminum is yours for the asking. Alcoa has put its 69 years of experience into exciting films and readable booklets... about alloy selection, fabricating methods (die castings, sand castings, extrusions, impacts, forgings, stampings, etc.), finishing, joining, brazing, welding. Immensely valuable material.

The films of especial interest to designers are described in a concise new bibliography. We urge you to write at once for your copy of this index — and then use it to order the books and films that will be useful to you. Write: Aluminum Company of America, 2181 Alcoa Building, Pittsburgh 19, Pa.



ALCOA ALUMINUM

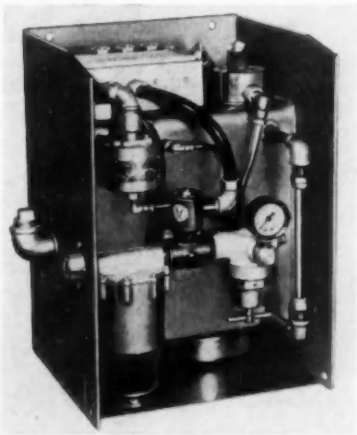
Your Guide to the Best in Aluminum Value

SPECIALIZED EQUIPMENT

(*Continued from page* 211)

ALEMITE DIV., STEWART-WARNER CORP.

MACHINE LUBRICATORS — Two new oil-mist lubricators are designed to provide automatic continuous lubrication for up to 300 or 500 bearing inches (one bearing inch equals one inch of shaft diam) of lubricated mechanisms while consuming one-tenth as much oil. Built-in safety switches respond instantly to the requirements.



Alemite oil-mist lubricator

The systems use compressed air to atomize oil into mist, which is then distributed through tubing to mechanisms such as anti-friction bearings, plain bearings, gears, slides, ways, chains, cams and rollers. They are operated automatically from the machine's "on-off" switch, have no moving parts, and only require filling of the oil reservoir, eliminating the human element from lubrication work. The flow of air through the bearings acts as a coolant and locks out dirt.

Circle 209 on postcard for more data

BLACK & DECKER MFG. CO.

ELECTRIC SCREWDRIVERS — With the addition of No. 10 adjustable and positive clutch Scruguns, a portable electric screwdriver line has been made more complete. Formerly, in the line that include drivers for screws from No. 8 through 18 sizes, the No. 10 size was available only with a center drive design best adapted for overhead suspension. The new No. 10 units are designed with pistol-grip trigger switch features that permit the operator to hold the tool comfortably like a gun.

The positive-clutch No. 10 unit contains a clutch designed to keep the screwdriving mechanism disengaged until the operator applies pressure. Thereafter the tool keeps driving until the operator releases his pressure. A feature of this mechanism is that it allows the operator to have control of the torque when driving screws in material where differing grains and densities require varying degrees of power to be applied to each screwhead.

On the other hand, the adjustable-clutch No. 10 tool can be adjusted so that the clutch disengages after a certain pressure has been reached. When connected to the new power speed control unit, the adjustable clutch model can also be reduced in capacity to drive screws of much smaller size.

For work in inaccessible places, a special model of the No. 10 Scrugun is also available with a 90-deg angle head.

Circle 210 on postcard for more data

ROSS OPERATING VALVE CO.

SHUTTLE VALVE—Two models of a new shuttle valve are offered in ¼-in. and ⅜-in. pipe sizes; length dimensions are 1¼ and 2⅜-in. With two inlets and one outlet, the brass unit can be used for either air or certain types of liquids. Weighing only 14 oz, the valve has a differential sealing pressure of 15 psi and operating pressure of 15 to 125 psi. Temperature range is up to 175 F.

Circle 211 on postcard for more data

SUNDSTRAND MACHINE TOOL CO.

CHUCK CONTROL UNITS — New Power-Grip control units for low-voltage (24 vdc) Sundstrand magnetic chucks come in three basic types and are available for use with chucks rated up to 4000 watts. The demagnetizing cycle for all control units requires a maximum of seven seconds. The units, consisting of a dust-tight control cabinet and remote control station, have been designed to machine tool standards, and operate from a 110-v a-c pilot circuit.

Type A units, smallest in the line, are rated up to 125 watts, with Types B and C units being available in a total of 15 ratings, ranging to 4000 watts. Basically, all models operate

(*Turn to page* 216, *please*)



We really don't grow them this way but we do produce them diversified, abundant, and of top Quality.

We get them to you promptly, bulk or packaged, from a Southern warehouse near you. Over one billion fasteners in stock!

From our wide range of sizes, heads, and materials, we meet your most specialized and unusual fastener requirements. Write on company letterhead for free samples and Stock List. Box 1360-AI, Statesville, N.C.

Wood Screws • Machine Screws & Nuts • A, B & F Tapping Screws Dowel Screws • Wood & Type U Drive Screws • Stove Bolts • Roll Thread Carriage Bolts • Hanger Bolts

Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA

WAREHOUSES:
NEW YORK • CHICAGO • DALLAS • LOS ANGELES



A TALENT FOR INVENTION: Leroy® Lettering Equipment—a K&E development—insures perfect neatness and uniformity, yet it is simple to operate and requires no special skill or training. One man can start a job and another finish it without any variation in lettering.

This K&E equipment comprises three basic, precision engineered parts: Leroy template, Leroy pen and Leroy scriber. Capitals, lower case, numerals, vertical or forward slanting letters can be drawn from a *single* template—an *exclusive* K&E feature. You can buy templates, pens, and scribers separately or in convenient sets.

Leroy templates offer a variety of alphabets, sizes and graphic symbols. Electrical, mathematical, mapping, geological and other symbol templates are available. Templates, with words or phrases that are frequently repeated, as well as templates with your own symbols, trade marks or designs, can be made to your order.

To save time and money in your drafting room specify K&E Leroy® Lettering Equipment. For other drafting or engineering equipment and materials also look to Keuffel & Esser Co.—your "Partners in Creating"—who have served engineering for 90 years.

K&E **KEUFFEL & ESSER CO.** New York, Hoboken, N.J., Detroit. Chicago, St. Louis, Dallas, San Francisco, Los Angeles, Seattle, Montreal.

SPECIALIZED EQUIPMENT

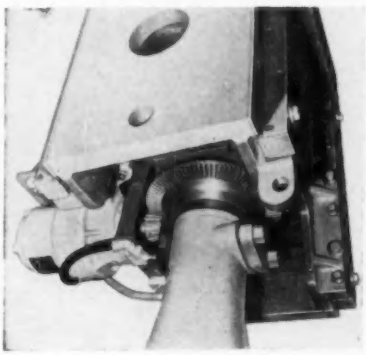
(*Continued from page* 215)

on the same principle using a heavy-duty power transformer and a selenium rectifier in a single-phase bridge circuit to furnish d-c power to the magnetic chuck.

Circle 212 on postcard for more data

VERSON ALLSTEEL PRESS CO.

PRESS RAM ADJUSTER — Motorized ram adjustment, available as optional equipment on a company's line of open back inclinable presses, offers advantages in short-run press-working. A one-half to one-horse-



Verson motorized ram adjustment unit

power electric motor, depending on the size of press, is mounted directly on the press ram. Up-down lock type control buttons, mounted at the operator's station, actuate the motor. A pinion gear mounted on the motor shaft revolves the adjusting screw through the bevel gear machined as part of the screw. The adjusting screw is threaded in the pitman and connected to the ram, thus moving the ram up or down depending upon direction of travel of the screw. A clamping cap on the pitman secures the adjusting screw at the desired position. The press ram can thus be quickly adjusted when changing from one die set to another.

Circle 213 on postcard for more data

BAKER BROTHERS, INC.

FAST-RESPONSE CIRCUIT—A new fast-response circuit for a line of automatic machine tools and plastic molding presses utilizes the Westinghouse Cypak system of machine control. The Cypak control system

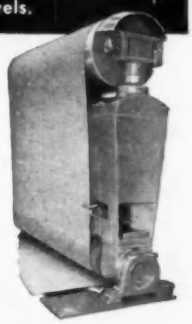
(*Turn to page* 219, *please*)

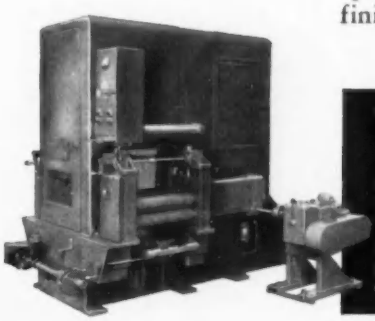
HILL GRINDING AND POLISHING MACHINES
For FINISHING
Any and All
FERROUS and NON-FERROUS MATERIALS . . .



HILL Polishing Machine
(Hydraulic Table Type)
For polishing individual sheets and plates. Hydraulic reciprocating table with centralized controls.

The basic HILL two-roll vertical head with upper steel idler roll and lower rubber covered contact or work roll (both dynamically balanced) over which the endless abrasive belt travels.





HILL Grinding and Polishing Machine
(Pinch-roll Type)
For pre-finishing, conditioning and polishing. Used as single units or in multiple units for progressive line polishing in wet or dry operations.

FLAT surfaces of ferrous or non-ferrous material can be brought quickly to the high finish so necessary for today's industrial and consumer products. The dairy, automotive, home appliance and engraving industries are typical of the wide range of application for these precise, labor saving machines.

HILL abrasive belt grinding and polishing machines are built in two general types. The hydraulic reciprocating table type polished individual sheets and plates. Table widths vary from 36″ to 60″. Table lengths range from 60″ to 240″. The Pinch-Roll type is for progressive line polishing. The HILL two-roll vertical head with endless abrasive belt is the basic principle common to both types.

When writing for information please indicate size and specifications of stock to be finished.

HILL ACME TOOLS FOR INDUSTRY

THE HILL ACME COMPANY

HILL DIVISION
ESTABLISHED 1882
1209 West 65th Street • Cleveland 2, Ohio

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES

new WELTRONARC* control gives you true automation in arc welding



BOOST'S PRODUCTION

Produces	Reduces
Precision Welds	Human Errors
Cleaner Welds	Worker Fatigue
Smoother Welds	Production Time
Uniform Welds	

Tungsten Inert Gas Fusion Welder Control

it's the finest in automatic controls

This new control contains the precision and high production features, which are desired by the most discerning welding engineers. It's the last word in the automatic control of precision fusion welding.

*Trade Mark of Weltronic Co.

used by leading jet manufacturers

It satisfies the difficult welding requirements encountered in jet engine fabrication, and in hard-to-weld alloys, such as titanium and the high temperature stainless steels.

it's all in one compact console

AC & DC motor controls, arc current and arc voltage regulators, electronic sequence timers, flexible programming adjustors—all electrical apparatus, except the motors, are inter-wired in the compact console, accurate to resistance welder specifications.

Write for Descriptive Literature.

Weltronic®

WORLD'S LARGEST SUPPLIER OF RESISTANCE WELDING CONTROLS

WELTRONIC COMPANY

19500 West Eight Mile Road • Detroit 19, Michigan

SPECIALIZED EQUIPMENT

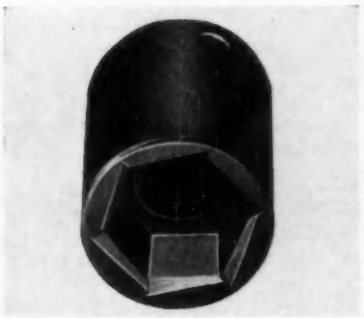
(*Continued from page* 216)

has no moving parts to wear, jam or otherwise cause trouble. Now any of the company's automatic machine tools or plastic molding presses is available with a Cypak system, and the company-designed circuit will be included. It is described as a fast-response circuit, highly versatile and adaptable to conditions.

Circle 214 on postcard for more data

APEX MACHINE & TOOL CO.

IMPACT SOCKET—A new fast-lead type of impact socket has a specially-designed broached opening for fully engaging the nut in one-sixth of a turn, almost instantly upon contact. It is not necessary to start and stop



Apex fast-lead impact socket

the power tool for each operation, nor is it even necessary to hesitate before the socket makes initial contact with the nut. Single or multiple power tools may be operated continuously. The sockets are being offered with hex openings ranging in size from ⅜ to 1-in.

Circle 215 on postcard for more data

ALLEGHENY LUDLUM STEEL CORP.

TOOL STEEL—Oilgraph-EZ is the designations for a new tool steel that gives improved machinability and at the same time a better finish. Its properties result from adding a small amount of sulphur (0.10 per cent) to the analysis of the steel. This sulphur content is equivalent to about 0.25 to 0.30 per cent of graphite in machinability.

A typical analysis of the material is: carbon (total) 1.45; manganese

(*Turn to page* 220, *please*)

Automatic feeding and setting with...

T-J

Speeds up riveting and clinching!

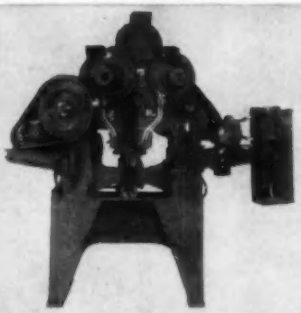
It's a quick step to *faster assembly* and *reduced labor costs* when you put T-J Rivitors and Clinchors in your production picture! These performance-proved machines are suited to a wide range of assembly jobs for aircraft, automotive, farm machinery, riviting jobs of all kinds.

T-J RIVITORS automatically feed and set solid rivets with high production. Electrically powered Rivitor sets solid steel rivets up to ⅞" long. Throat depths 8" to 36".

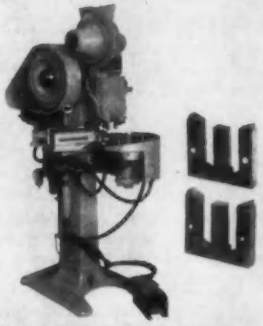
T-J CLINCHORS set clinch nuts with fully automatic operation, controlled by a single foot pedal. Available in Underfeed and Gravity feed models, throat depths 8" to 36".

Send today for these helpful references: Rivitor bulletins 646 and 555 . . . Clinchor bulletin 555. The Tomkins-Johnson Co., Jackson, Mich.

T-J
TOMKINS-JOHNSON
RIVITORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS



RIVETS 4 AT A TIME! Special quadruple riveting unit, incorporating two Model "RR" Twin Rivitors, mounted on a special welded steel base. Equipped with air-operated hold down mechanism and a safety air trip arrangement. Tooled for riveting left hand and right hand automotive muffler bracket assemblies.



SPECIAL TWIN RIVITOR! Tooled for 6 station indexing fixture, incorporating automatic clamping and ejecting mechanisms, for riveting laminated armature assemblies.



T-J CLINCHOR adaptable to a wide range of clinch nut setting problems. Gravity feed model shown here.

Shuford's SHURTAPE®

high quality masking tape

makes the "finish" job better!



Shuford's SHURTAPE CP-11 is a high quality masking tape with rubber-impregnated, crepe paper backing specifically developed for automotive and aeronautical uses. Cuts costs by eliminating retouching, reducing clean-up time and preventing stains.

- Thin gauge and sharp, clean edges prevent paint build-up.
- Extreme flexibility permits easy conformity to curves.
- Features easy release from the roll, instant adhesion and clean strip without tearing.

Performance tests prove that Shuford's SHURTAPE CP-11 withstands temperatures of 300° F for two bake cycles.

Make the "finish" job better, use Shuford's SHURTAPE CP-11!

There is a high temperature stain-resistant Shuford's SHURTAPE for any masking application.

Check your wholesale distributor on the SHURTAPE SHURSTAKES program.

Write for information about Shuford's complete line of pressure-sensitive tapes.

CLOTHES LINES • TWINES
PRESSURE-SENSITIVE PAPER TAPES
SASH CORDS • WEATHER STRIPPING
COTTON & RAYON YARNS • EXTRUDED PLASTICS

Shuford SINCE 1880 Mills, INC
HICKORY, N. C.

2761

World's Largest Manufacturer of Cotton Cordage

SPECIALIZED EQUIPMENT

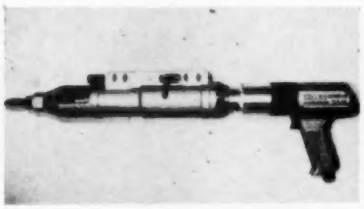
(*Continued from page* 219)

0.80; silicon 1.15; chromium 0.20; molybdenum 0.25; sulphur 0.10; and graphite 0.20 to 0.40 per cent. Applications include drill jig bushings of small diameter, carbon steel taps, gages, punches, dies, and machine spindles.

Circle 216 on postcard for more data

KELLER TOOL DIV., GARDNER-DENVER CO.

AIR DRILL—Usable for drilling aluminum alloys, titanium or heat-treated stainless and alloy steels, a portable air-powered drill, with a positive mechanical feed attachment, develops up to 1000 lb of thrust. Called the K-Matic, it drills up to ⅜-in. holes in hard materials. The positive



Keller K-Matic air-powered, positive-feed drill for ⅜-in. or smaller drills

differential lead screw prevents plunging on break-through, helps minimize work-hardening, and often provides a hole finish clean enough to eliminate the need for reaming. With standard bits and normal drilling conditions, the tool reportedly drills holes within 0.001 to 0.003-in. oversize and uniform to ±0.0007-in. The lead screw also permits uniform penetration through sandwich construction.

A series of drill bushing tips for mounting the K-Matic to a jig or fixture is also available.

Circle 217 on postcard for more data

CHICAGO RAWHIDE MFG. CO.

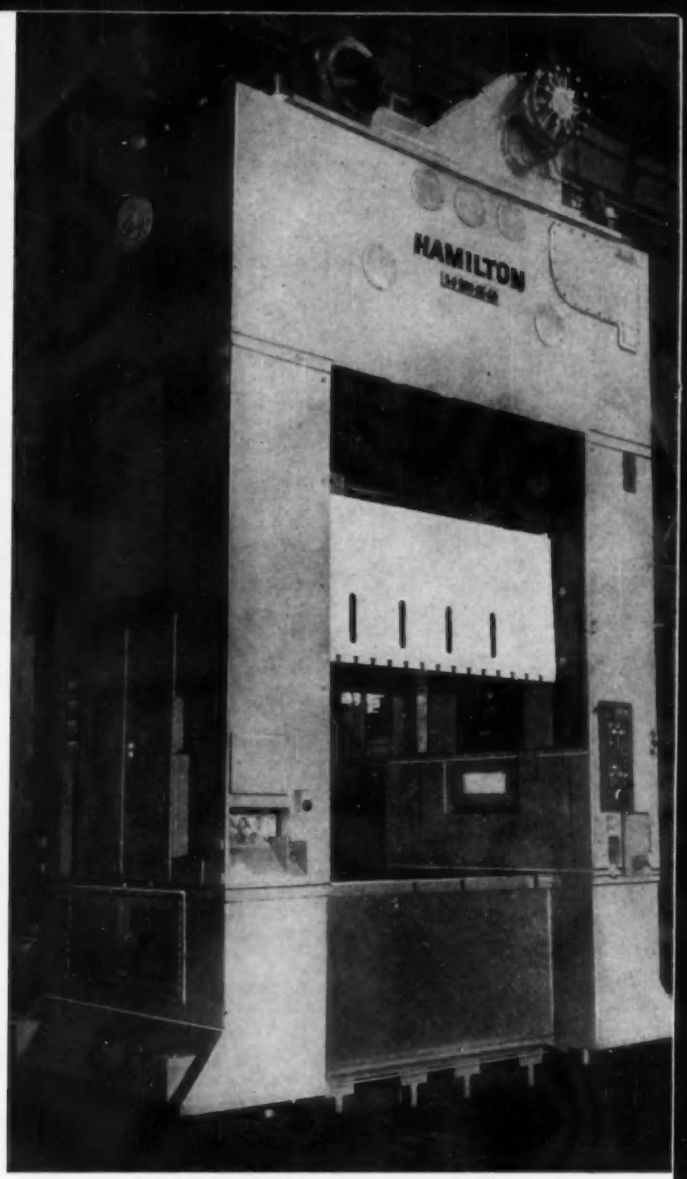
NYLON HAMMER FACES — The newest development in a line of "soft-striking" jawhead and solid head hammers is the addition of replaceable nylon faces.

The nylon material resists acids, oils and moisture. The faces will not chip, spark, mushroom nor mar polished or painted finishes. Also, that

(*Turn to page* 222, *please*)



Hamilton 400-ton 2-point eccentric press



Hamilton 500-ton 4-point eccentric press

Hamilton mechanical presses spell the maximum in versatility

No matter what your press requirements are, you probably won't have to incur the extra expense of special designing and "tailor-made" manufacturing if you explore the versatility of the two basic Hamilton press designs pictured above.

The Hamilton 400-ton 2-point eccentric press represents our conventional design, meeting all the basic needs of stamping plants all over the world. And it is so designed that many optional features may be readily added to transform it into a press capable of doing more highly specialized work.

Extra features include automation equipment, air and electric controls and outlets, die lights, die safety blocks, provision for feeds, inbuilding and automatic circulating oil lubrication. These features are built into the 4-point press shown above. Let your Hamilton sales engineer discuss your needs with you.

Hamilton Division Hamilton, Ohio

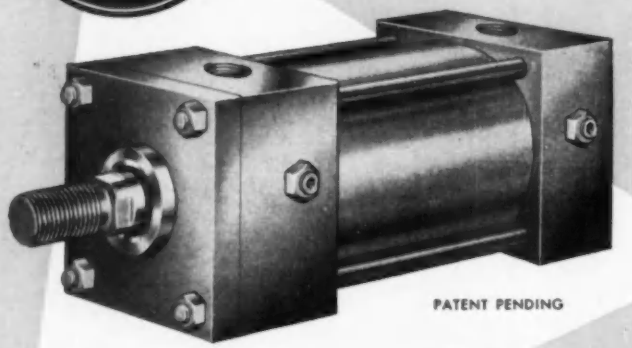
BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON

FOR AUTOMATION

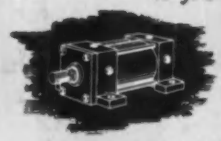
SP CYLINDERS



PATENT PENDING

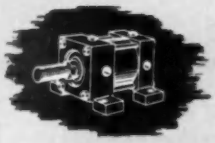
top performance–longest life

All S-P cylinders are engineered throughout for high speed, efficient operation. Piston rods are heat treated and hard chrome plated to resist scoring. Bronze cartridges with extra long bearing surfaces are easily removable for quick servicing of rod seals and wipers. End plates are rolled steel. All S-P cylinders are built to JIC standards.



S-P STANDARD AIR CYLINDERS have brass tubes to eliminate corrosion. Cushions float on O-rings for maximum cushioning. Eleven bore sizes, 1½" — 14". 21 mounting types. Readily modified for oil or water. Send for Catalog No. 110.

S-P HEAVY DUTY AIR CYLINDERS for automation and other severe applications. Double porting for extreme high speeds. Heavy wall seamless steel tube. Nine bore sizes, 1½" — 8". Five mounting types. Approved and used by two major automobile manufacturers. Send for Catalog No. 109-A.





S-P HIGH PRESSURE HYDRAULIC CYLINDERS have seamless steel tube. Special locking mechanism eliminates tie rods. Designed for 2,000 psi. Eleven models in 11 sizes. Send for Catalog No. 104.

Step up production with S-P cylinders. Representatives in principal cities. Prompt deliveries. Order catalog by number shown above. The S-P Manufacturing Corporation, 30201 Aurora Rd., Solon, Ohio. *In greater Cleveland.*

SPecify SP

SP THE S-P MANUFACTURING CORP.

SOLON, OHIO • *IN GREATER CLEVELAND*

ESTABLISHED 1916 A BASSETT COMPANY

NON ROTATING AIR AND HYDRAULIC CYLINDERS • ROTATING AIR AND HYDRAULIC CYLINDERS
POWER CHUCKS • COLLET AND DRILL PRESS CHUCKS • AIR PISTONS, VALVES, ACCESSORIES

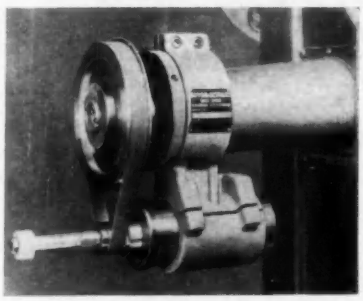
SPECIALIZED EQUIPMENT

(*Continued from page* 220)

they will not shrink nor loosen in the head or face bore of the hammer. Additional striking surface is provided by a new shoulder design where the outside diameter of the face is now flush with the head casting. This feature minimizes danger of sparking caused by the head casting striking work on inaccurate blows.

Circle 218 on postcard for more data

BOYAR-SCHULTZ CORP.



GRINDER ATTACHMENT—For use with surface grinders, this high-speed attachment provides a higher spindle speed (14,000 rpm) and is designed for the grinding of angles or slots too small to permit the use of standard size grinding wheels, serrations, T-slots and other hard-to-get-at surfaces. It mounts on the surface grinder spindle; belt tension is adjusted through the use of an eccentric bushing.

Circle 219 on postcard for more data

MINNEAPOLIS-HONEYWELL REGULATOR CO.

MACHINE CONTROLS—Electro-hydraulic control of machinery is made practical by a transistorized servo amplifier and an electro-hydraulic servo valve. The two components combine the best features of electronic signal sensing with hydraulic control of variable delivery pumps, hydraulic motors, cylinders and similar equipment. The XRJ301A amplifier and the XVJ300A servo valve make it feasible to apply hydraulic power to many applications previously limited to electric drives; and also provide precision control of existing hydraulic equipment which could not prevously be controlled automatically.

The amplifier is designed to receive signal inputs from any standard 60-cycle a-c signal source.

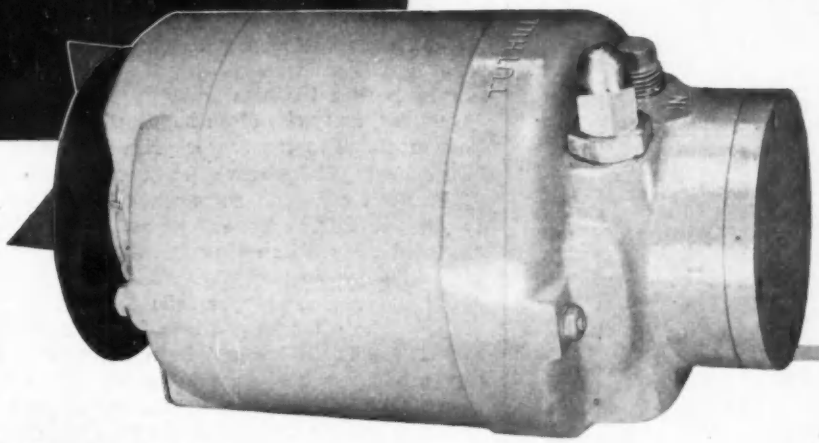
(*Turn to page* 228, *please*)

ANOTHER PUMP PROBLEM...SOLVED BY **TUTHILL**

new POWERMITE

PUMP and MOTOR COMBINATION

• COMPACT • LIGHTWEIGHT
• ECONOMICAL



Here's another example of Tuthill's ability to develop the pump to fit the problem. This compact, new Powermite motor-pump combination, a Tuthill exclusive, was developed to meet the requirements of original equipment manufacturers with unusual space and weight limitations.

Motor and cooling blower have, in effect, been incorporated into the internal gear positive displacement rotary pump. The whole unit takes up no more space than a standard electric motor. A single shaft serves all units of the Powermite—and the elimination of couplings, other parts and labor permit substantial economies for OEM applications.

The pump section contains a built-in strainer, and, if desired, an adjustable relief valve. Powermite can be furnished with cooling blower, as illustrated, or it may be supplied with a shaft extension for driving other accessories.

Powermite can be furnished in a wide variety of pump and motor combinations for use in hydraulic, oil burning, lubricating, and other services involving many different fluids. For example, the model illustrated has a capacity of 18 gallons per hour at 300 psi, and is driven by a 1/12 hp motor at a speed of 1750 rpm.

Manufacturers desiring to investigate the cost, space and weight saving advantages of incorporating Powermites into their products are invited to submit detailed specifications. Or, if preferred, a Tuthill representative will call.

TUTHILL PUMP COMPANY
941 East 95th Street, Chicago 19, Illinois
Gentlemen:
☐ Please have your representative call to discuss Powermite applications in my product
☐ Please send catalog describing complete Tuthill line.
NAME_____ COMPANY_____
TITLE_____
STREET_____
CITY_____ STATE_____

Tuthill Manufactures a Complete Line of Positive Displacement Rotary Pumps in Capacities from 1 to 200 GPM, for Pressures to 600 PSI, Speeds to 3600 RPM.

TUTHILL PUMP COMPANY

941 East 95th Street, Chicago 19, Illinois
Canadian Affiliate:
Ingersoll Machine & Tool Company, Ltd., Ingersoll, Ontario, Canada

PUMPS FOR YOUR PURPOSE



METALS

(*Continued from page* 186)

New Low Price for Copper

After maintaining the 29¼ cent price for seven weeks the three big American copper producers cut their price to 28½ cents in mid-August. It may not have been enough, for almost immediately the Selection Trust in London lopped off 1¼ cents to bring the price to British consumers to 26¼. The price on the London Metal Exchange promptly declined to 26 cents. Custom smelters were quoting a shade less than the producers with business dull.

In short, as has so often happened in the past, the numerous cuts in the copper price instead of stimulating buying have scared canny users away. Undoubtedly a time will come when buyers will enter the market in force, but as long as the price continues unsettled and sentiment bearish, there will be no rush to rebuild inventories which are known to be low.

Output of crude copper fails to show as yet the effect of the cutbacks put into force at some of the mines. Reduction has not been uniform, and some new production has come in which offsets to some extent the cutbacks made by others. At mid-August there was no indication that the Chilean mine output would be reduced, nor have all the Rhodesian producers nor Katanga joined with the American mines in lessening new copper supply.

Undoubtedly many small mines have been forced to suspend operations because of low prices. It is also true that at the present price of 28½ cents, about 4000 tons a month could be offered to the Government under terms of agreement made during the Korean conflict, and if the price went below 27 cents, a further 6000 tons a month could be offered. This would be about 11 per cent of the normal mine output.

Sales of Lead and Zinc Improve

Sales of lead and zinc early in August were the highest in over a year. Apparently domestic consumers were convinced the new low prices—10 cents a pound for zinc and 14 cents for lead—were going to hold. There is little doubt that metal inventories had been allowed to drop while price cutting of the metals was the vogue, and the strong buying movement that ensued may have been more to replenish them, rather than indicating increased activity at zinc users' plants.

The substantial cuts in production put into effect by some of the big producers, notably American Smelting & Refining Co., served to show that the operators were in earnest in attacking over-production, the root of the trouble. It cannot be over emphasized that consumption during the year for both metals has held up extraordinarily well. It has been increased mine output, plus heavy imports of cheap

(*Turn to page* 226, *please*)



the RIGHT SIZE and SHAPE...

in welded steel tubing

What size do you need? Standard produces welded tubing in a vast range of sizes and grades—stainless, carbon and low alloy. What shape do you need? Standard produces it in round, square, rectangulars, and a host of special shapes. Maybe you have a design problem? The specialists at Standard are anxious to work with you. Whether your requirements call for structural, mechanical, or pressure tubing, Standard produces them to your specifications.

FREE

Write for 8-page folder on all Standard products.

STANDARD

THE STANDARD TUBE COMPANY

24400 PLYMOUTH ROAD • DETROIT 39, MICHIGAN

Welded stainless tubing and pipe • Welded carbon steel mechanical • Boiler and heat exchanger • Exclusive rigidized patterns • Special shapes • Steel Tubing—Sizes 1/2" OD to 5 1/2" OD—.028 to .260 wall • Stainless Pipe—Schedule 40: 3/8" to 2" I.P.S.; Schedules 5 and 10: 1/8" to 4" I.P.S.—Stainless Tube—1/4" to 4 9/16" OD —.025 to .165 wall in square, rectangular, and special shapes of equivalent sizes.

(Advertisement)

Cold Heading Cost Savings

Actual Cost Cuts As High As 70%

The most important consideration we can point out to the designer or purchaser of fasteners and small parts is that any part which can be machined from rod stock is also potentially available from the cold heading manufacturer. This technique offers speed of production, without scrap loss, plus superior strength and appearance for low cost and high design efficiency.

The designer need not be restricted to standard fastener sizes when they do not meet the requirements of his application. It is often much less expensive to specify a rivet, nail or screw to meet the task exactly as the application requires, than it is to compromise its function for the sake of "standards." While there is nothing mysterious about the cold heading process, experience has proved it to be of inestimable value for getting maximum quality and output at a minimum cost. While the really spectacular advantages in cost show up in runs of several thousand pieces, we are also able to take care of short run requirements. We welcome and expect manufacturers to come to us for advice and assistance concerning their fastener problems.

Given complete specifications, including a drawing and an idea of the application, we can quickly tell you whether or not it will be advantageous to have your fastener or part JOB-DESIGNED by HASSALL. The remaining important aspect of our service to you is the ability to get into production quickly and make prompt shipment.

Write for a copy of our new booklet, "What the Designer Should Know about Cold Heading".

John Hassall, Inc.

P. O. Box 2195

Westbury, Long Island, N. Y.

METALS

(*Continued from page 224*)

zinc and lead, that has upset the applecart. Recognizing this, American Smelting instituted a 30 per cent cut in its production of Special High Grade, amounting to 8 per cent of the total monthly production of all U. S. smelters. With previously announced cuts by the company, a total of 5700 tons a month is lopped off the national output. Other producers followed.

The July statistics gave some cause for cheer. Shipments to industry were about 4000 tons more than in June and slab production was less by 5000 tons, and 11,000 tons less than in May. Nevertheless, slab output still exceeded total shipments by 12,000 tons, and consequently stocks of metal on hand at the month's end had climbed to the uncomfortable level of over 146,000 tons.

Administration Backs Higher Import Tariffs

Administration spokesmen reversed their former attitude and have come out flatly for steeper excise taxes to deter unneeded imports. Peril points are set at 17 cents for lead and 14½ cents for zinc. When excessive imports force the domestic prices below the peril points, sliding scale duties would be imposed, increasing as the price fell. The proposed measure elicited lively debate before the Senate Finance Committee hearings, with the opposition declaring that Government interference in the zinc-lead economy has led to overproduction and unhealthy price swings for the metals, and in particular citing the danger of incurring hostility of friendly neighbors.

Aluminum Price Raised

As was anticipated, the American aluminum producers raised their base prices for pig and ingot by one cent a pound, following the July wage increases. This action established the price of pig at 26 cents a pound and ingot at 28.1 cents. Other base aluminum prices have been similarly raised, resulting in an increase in mill products prices by about 4 per cent.

It is noteworthy that these increases were made at a time when rather definitely aluminum supply is exceeding demand and apparently flies in the face of textbook economics that demand is stimulated by lowering prices instead of raising them. Be that as it may, the aluminum producers take the position that the modest one cent price increase does not completely offset the higher costs incurred by the wage hike and are passing it on their consumers accordingly. They point out that over a period of years the aluminum price has lagged far behind the upward price trends in other principal metals.

That the industry has, at present, over capacity admits of no argument. In the first six months of 1957, while primary production declined 5 per cent from 1956, capacity was at an all-time high of 1,775,000 tons, with new expansion projects scheduled to bring in more than 2.6 million tons by 1960.

No Cutback in Expansion Program

Producers explain their postponement of any decision to cut back production to match demand by their long-term contracts for electric power under which they must pay for some power even if it is not used. They are definitely of the belief that consumption will catch up with output, if not this year, then in 1958 or 1959 and are continuing with their current expansion programs. The increase of stocks in the hands of producers over the past 12 months from 17,000 tons to 195,000 tons causes no expression of alarm.

Some of the aluminum that Alcoa and Kaiser put to the Government under agreement made during the Korean war has not been accepted. It is reported that the Government may take 200,000 tons from Alcoa and call the contract settled. The contracts expire in 1½-2 years. About 150,000 tons imported from Canada would not qualify according to the Government's contention.



RING DESIGN

to keep up

with your

engineering progress



For forty-seven years McQuay-Norris has helped automotive designers convert ideas into reality.

For ring design service that always measures up to your needs, call on us.

McQUAY-NORRIS

MANUFACTURING COMPANY **St. Louis • Toronto**

Largest Producer of Small Rings in the Automotive Industry

SPECIALIZED EQUIPMENT

(*Continued from page 222*)

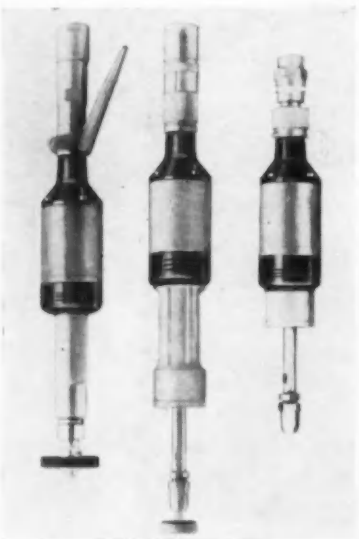
The amplifier supplies the driving power for the electro-hydraulic, three-way servo valve which, in turn, controls the flow of oil to hydraulic linear or rotary motion drives. The single stage servo valve is driven by a high performance torque motor and is available in ratings up to 10 gpm and 3000 psi.

Linear motion control can be applied to hydraulic presses, reciprocating drives used in planers, grinders, or saw mill carriages, and in a variety of straight line positioning applications. Rotary motion applications include lead screw feeds, spindle drives, and processing machinery which require precise control of shaft rotation. Control combinations possible with the electro-hydraulic servo "team" include stroke control feedback, pressure or flow feedback, and feedback of load position, velocity, force, torque, etc.

Circle 220 on postcard for more data

ROTOR TOOL CO.

WHEEL GRINDERS—A new line of small wheel air grinders is known as the M1170 series. Type designations are M1170 short, M1171 long,



Rotor M1170 series air grinders

and M1172 small end. From the basic M1170 motor, of three speeds, 8000, 12,000 and 17,000 rpm, with five spindles and three handles, 45 models and 20 different arbors and collets are available. In addition to versatility, principal features are stated to be 50 per cent more power, a new balanced centrifugal governor, simplified construction, and quieter operation.

Illustrated (left to right) are the M1172 small end type with snap throttle, wheel arbor and straight wheel; the M1171 long type with standard spindle, twist throttle and ¼-in. collet; and the M1170 short type with Q.A.W. sleeve throttle, standard spindle with ¼-in. collet.

Circle 221 on postcard for more data

HELLER TOOL CO.

TOOL AND DIE STEELS—A new line of more than 1300 standard stock sizes of oil and air-hardening, flat-ground die steels is suited for a variety of tool and die applications. Called Nucut Die Steels, they feature a surface finish of 25 to 35 micro-inches, easy machinability, and wide hardening ranges. Surfaces, ready for immediate layout, are protected in shipment and storage by special packaging, which includes heat-treating instructions.

The oil-hardening type is available in 18- and 36-in. lengths, in widths from 1/64 to 14-in., and in a wide variety of stock sizes. The air-hardening type comes in 36-in. lengths in a range of widths and thicknesses, including squares.

Circle 222 on postcard for more data

CLARK-CUTLER-McDERMOTT CO.

MACHINE MOUNTING PAD—To reduce noise and absorb vibrations and shock loads, a new machine mounting pad is now being offered for use with equipment such as punch presses, electric motors, machine tools and similar applications. Called Air-Loc, it is made from Geon polyvinyl resin, sisal, and granulated cork fused into an integrated pad.

A feature of Air-Loc is its integrated cross-grid embossing. This cross-grid surface is not cemented to the body of the pad, but is an integral part of the pad. Therefore, no cementing or bolting is required except in a few special installations.

Circle 223 on postcard for more data

BUCKEYE TOOLS CORP.

MINIATURE GRINDER—For precision, detailed grinding in tool rooms and on production work, a new high-speed, vane-type grinder is now being offered. Called the Mini-Grinder, it is only 3¾ in. long and weighs only 3½ oz. Rated capacity is ½ in. mounted point or grinding wheel. The tool has a ⅛ in. precision-ground collet. A rotary valve in the tool provides infinite speed control from 0 to 50,000 rpm.

Circle 224 on postcard for more data

ELECTRICAL MFG. DIV., NATIONAL ACME CO.

CONTROL SWITCH — Rated 600-v a-c or d-c, a new dust, oil and water-tight pushbutton control switch is of heavy-duty construction and meets JIC and National Machine Tool Builders' Association specifications. Called the Gold-N-Ring, it is designed for a wide range of applications, including machine tools and automated



Namco Gold-N-Ring pushbutton switch with flush head operator and one NO-NC contact block; and a four-button control station

production equipment, that require dependable performance from components that go to make up control stations and panels.

Design features of the new switch include plastic shields to enclose the large silver alloy contacts, unit-molded main contact block to assure alignment and simplify assembly, fully guided plunger of crosshead design to prevent binding, and oil-resistant rubber diaphragm in operator head to seal out oil, water and dust.

Circle 225 on postcard for more data

AUTOMOTIVE INDUSTRIES KEEPS YOU INFORMED

This Inland Filler Strip



permits complete versatility of design!

Inland Self-Sealing Weather Strip frees you from the extra cost of special moldings, channels, binder strips or cement. How? With this amazing *Filler Strip* which puts both glass and body panel under powerful compression assuring permanent, *leakproof protection* under any weather condition.

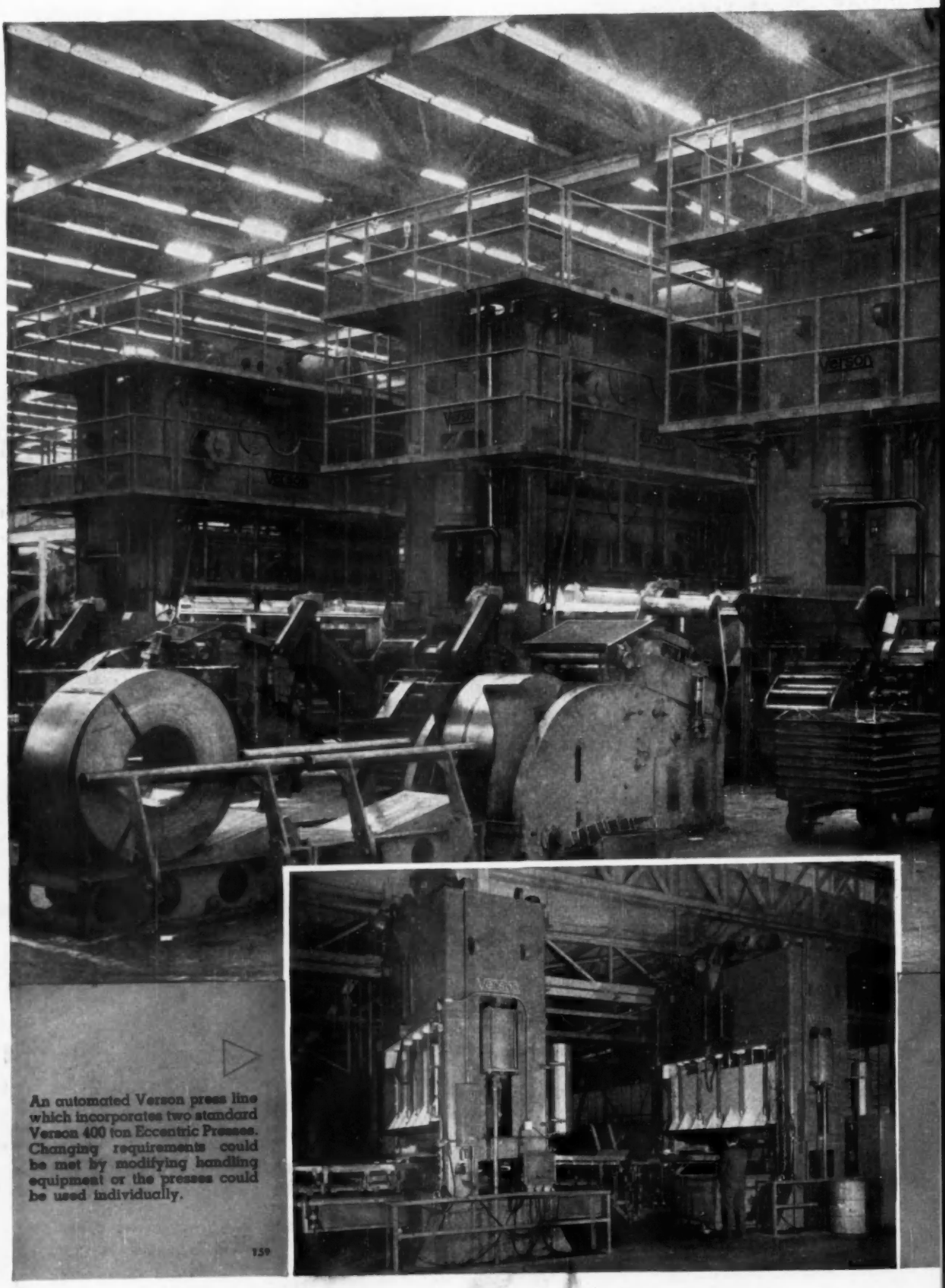
Its molded, *one-piece construction* is designed to fit any size or shape of glass. Inland Self-Sealing Weather Strip is available in many standard sizes, or quickly and easily, tailor-made to your specifications. Send design prints for complete details and cost. Write or wire.

INLAND

self-sealing weather strip

INLAND MANUFACTURING

INLAND MANUFACTURING DIVISION
General Motors Corporation, Dayton, Ohio



An automated Verson press line which incorporates two standard Verson 400 ton Eccentric Presses. Changing requirements could be met by modifying handling equipment or the presses could be used individually.

159



A good example of Transmat versatility. Each of these three identical 800 ton, 8 station Verson Transmats is capable of making any of four different automotive parts at the rate of 1000 per hour.

You can combine versatility with automatic high speed production

. . . with Verson Transmat Presses or an automated Verson press line

Verson Transmat Presses or Verson Automated Press Lines are designed first and foremost for the purpose of producing a specific multi-operation stamping in large quantities at the lowest possible cost. Any other consideration is secondary to the achievement of this objective.

However, Verson engineering has made it possible to offer surprisingly broad versatility in machines that would normally be considered single purpose. The Transmat, for example, has individually adjustable wedge slides which may be arranged for ram cushions. Adjustable stroke individual knock out cylinders are provided at each station. A variety of bed cushion arrangements is available. Provision can be made for stack or coil feed. Non-oscillating feed bars are adaptable to changing requirements. By taking advantage of these features, users have been able to make more than one part on the same Transmat.

The automated press line, since it often incorporates standard presses, is even more versatile. Handling equipment can often be modified to accommodate radical changeover.

If uncertainty about the adaptability of high production tool ups to changing requirements has kept you from taking advantage of the cost reductions they make possible, it is time to talk to Verson application engineers. They will welcome the opportunity to show you what has been done and what can be done. And remember, the Verson concept is to give you versatility without sacrificing the cost cutting advantages of high output.

A Verson Press for every job from 60 tons up.

Verson TRADE MARK

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9307 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • 8300 S. CENTRAL EXPRESSWAY, DALLAS, TEXAS

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES
TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

Young

cools the heart of this tough baby!



Young combines super-strength radiator and transmission oil cooler for this 6-cylinder 145 hp engine.

Ingenious Young Engineering combines oil cooler and radiator as an integral space saving unit in the M 50. The oil cooler is suspended for vibration-free operation. Patented Young turbulators provide faster, more efficient oil cooling. The radiator assures proper engine jacket water cooling.

Young radiators, quality-built throughout were chosen to provide the cooling system so vital to the powerful heart of this fighting equipment. Developed by the Industry-Ordnance design team of Allis-Chalmers and the Detroit Arsenal as an anti-tank weapon, and later adapted by the Marine Corps, the M 50 vehicle (Ontos) claims more fire power than any other land combat vehicle in history.

Whatever your heat transfer requirements—from military vehicles to tractors, industrial, agricultural or power plant applications—contact Young Radiator Company, specialists in all heat transfer problems. There is no obligation.

"YOUNG RADIATORS ARE USED WHERE THE GOING IS TOUGH"

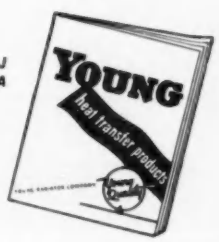
Young RADIATOR COMPANY

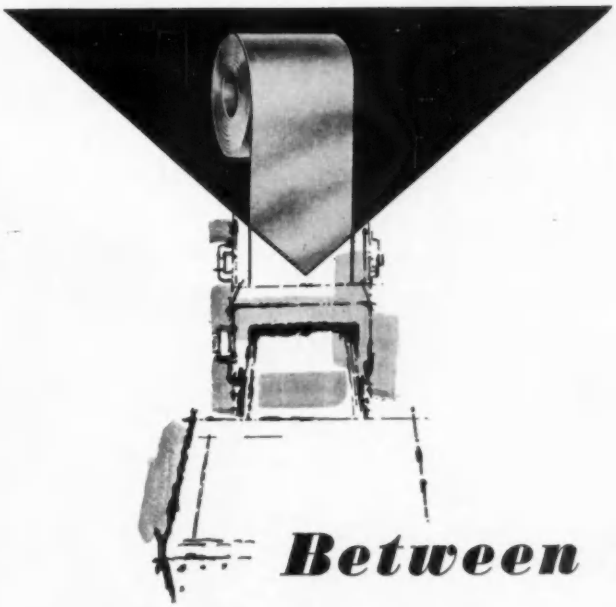
RACINE, WISCONSIN

Creative HEAT TRANSFER ENGINEERS

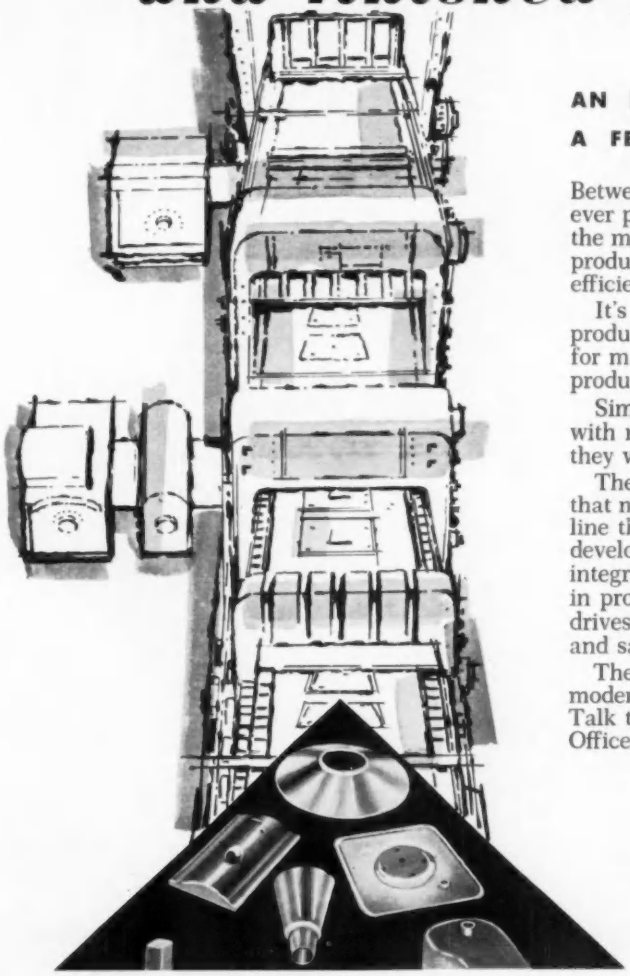
Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

Write Dept. 107-J for catalog 148-A





Between material and finished part...



AN IDEA THAT MAKES SENSE —
A FEDERAL-WARCO PRODUCTION LINE

Between material and finished part is the ever present problem of bringing together the machinery necessary to perform all production on operations as speedily and efficiently as possible.

It's here, the Federal-Warco, this packaged production line has proved to be the answer for many of the nation's foremost production experts.

Simply provide Federal-Warco engineers with material and part information and they will develop a line to do the job.

The advantages: One source responsibility that means faster, more thorough service; a line that is 100% harmonic, all stations developed especially to work in synchronization; integrated and automated handling of work in process; the possibility of utilizing common drives and bases, reducing operating costs and saving valuable floor space.

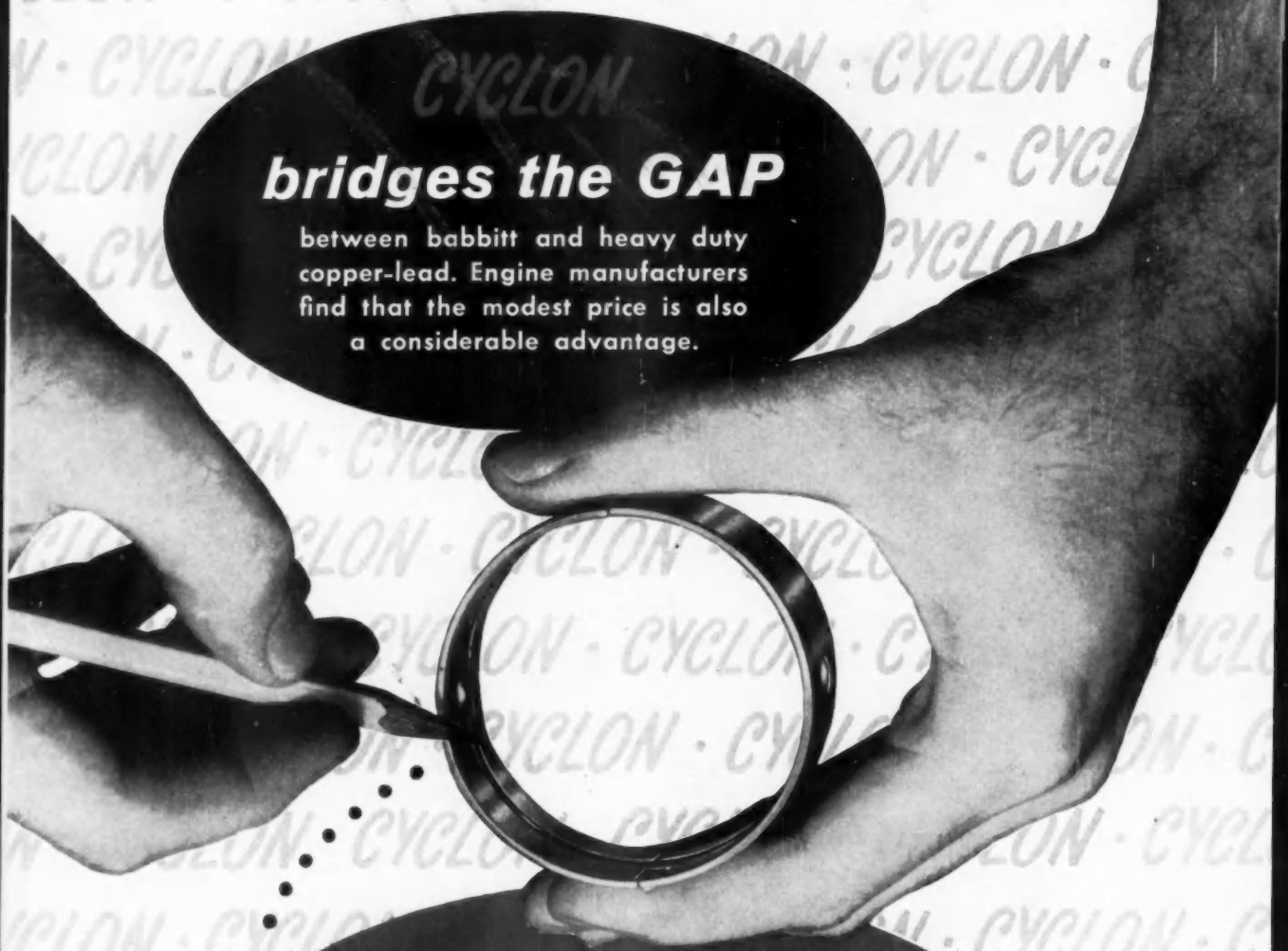
There is much more. Why not look into this modern method of production line manufacture? Talk to your Federal-Warco representative. Offices in all leading industrial areas.

Federal / Warco
PACKAGED
PRODUCTION LINES

423 THE FEDERAL MACHINE AND WELDER COMPANY • WARREN, OHIO

bridges the GAP

between babbitt and heavy duty copper-lead. Engine manufacturers find that the modest price is also a considerable advantage.



How *CYCLON* excels

- High load-carrying capacity
- Excellent embedability
- Extremely good comformability
- Low scoring tendencies
- High corrosion-resistance
- Bronze matrix structure
- Superior thermal conductivity
- High fatigue resistance
- No hardening of crankshaft necessary
- No overplate required
- Low cost advantage

DETROIT ALUMINUM & BRASS CORPORATION

DETROIT 11, MICHIGAN

MANUFACTURERS OF ORIGINAL EQUIPMENT SINCE 1925

from cold strip to finished tubing
IN SECONDS!
with a YODER
ELECTRIC-WELD TUBE MILL



One of the fastest . . . and one of the least expensive . . . methods of making steel tubing is with a Yoder Electric-Weld Tube Mill. The Yoder method eliminates the need for time-consuming heat treatments and costly conditioning furnaces for most tube needs. Scrap losses, too, are far lower than any other method . . . usually less than 2%.

The Yoder Type-M Mill shown above is operated by one man and a helper. Coiled strip on this mill is continuously cold-roll formed, welded and cut to required lengths in a matter of seconds . . . at speeds up to 340 f.p.m. The quality of the resulting tube is *constantly* better than the requirements of commercial standards. This is one of many reasons why manufacturers and users of tubing the world over are using more Yoder mills than all other makes combined.

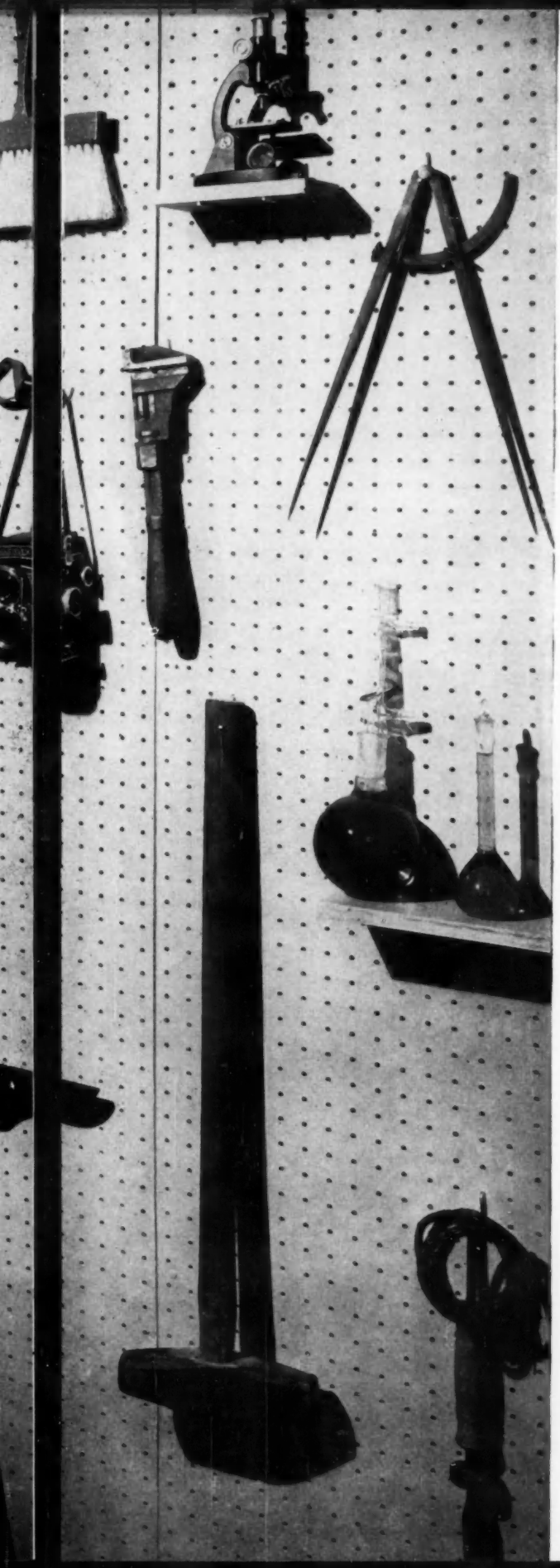
If your business requires pipe and tubing, ferrous or non-ferrous, in sizes from ¼-inch to 26-inch diameter, Yoder can supply the engineering service and machines to produce it faster and better for less! For complete details, write for the Yoder Tube Mill Manual. It's yours for the asking.

THE YODER COMPANY
5563 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING
YODER
MANUFACTURING

PIPE AND TUBE MILLS (ferrous or non-ferrous)
COLD ROLL FORMING MACHINES
ROTARY SLITTING LINES





Can a man be an expert in everything?

IT'S SAD BUT TRUE that the product design engineer of today has to be a many-faceted expert. He has to be an engineer *and* a materials expert *and* a production expert. He has to be well up on purchasing fundamentals, plus the elements of cost accounting.

There is one design responsibility from which we can give you some relief, though. That is the selection of springs. Spring design is a field unto itself, and, although we'll be glad to give you mountains of interesting information on the subject, why concern yourself with it? We'll do the work for you.

AS&W spring engineers will gladly work with you to select the right combination of spring characteristics that will do the job well. Most important: they may be able to suggest a slight design change that will drastically lower the *cost* of the spring.

Just call your nearest AS&W representative.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO,
PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.,
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN *QUALITY* SPRINGS

UNITED STATES STEEL

USS

Up-to-the-minute facts on the new word in industry!

APPLIED AUTOMATION

Practical, factual coverage of the basic concepts of automation and their applications in industry today — particularly in automotive and aircraft production.

Here for the first time, gathered from the pages of AUTOMOTIVE INDUSTRIES, are descriptions of the continuing technological progress which has accelerated interest in the approach to continuous automatic production. Covering:

MACHINING
PLATING
TESTING
WELDING
PRINTING
FORGING
PAINTING
ASSEMBLING
HEAT TREATING
INSPECTING

and many other phases in this comprehensive review.

AUTOMATION OR AUTOMATICITY is the most important development in industry today. What is it? Why has it stirred industry to its depths? You should be informed and be able to discuss intelligently and understand thoroughly—read APPLIED AUTOMATION.

Send today for your copy of this vital new book — use the coupon below for ordering.

THE CHILTON COMPANY **Book Division**
56th and Chestnut Sts.
Philadelphia 39, Pa.

Please send me.....copies of APPLIED AUTOMATION at $6.00 per copy.

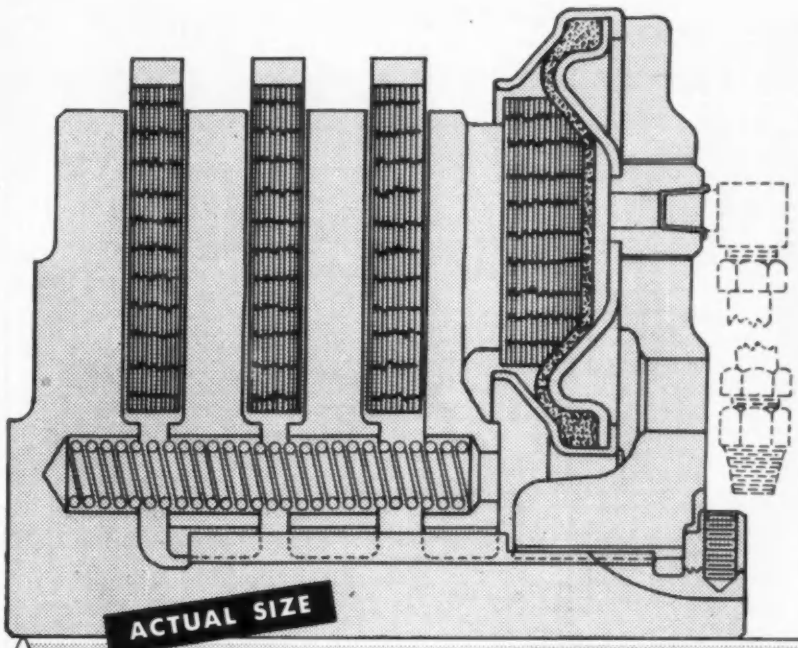
NAME .....

ADDRESS .....

CITY..... Zone..... State.....

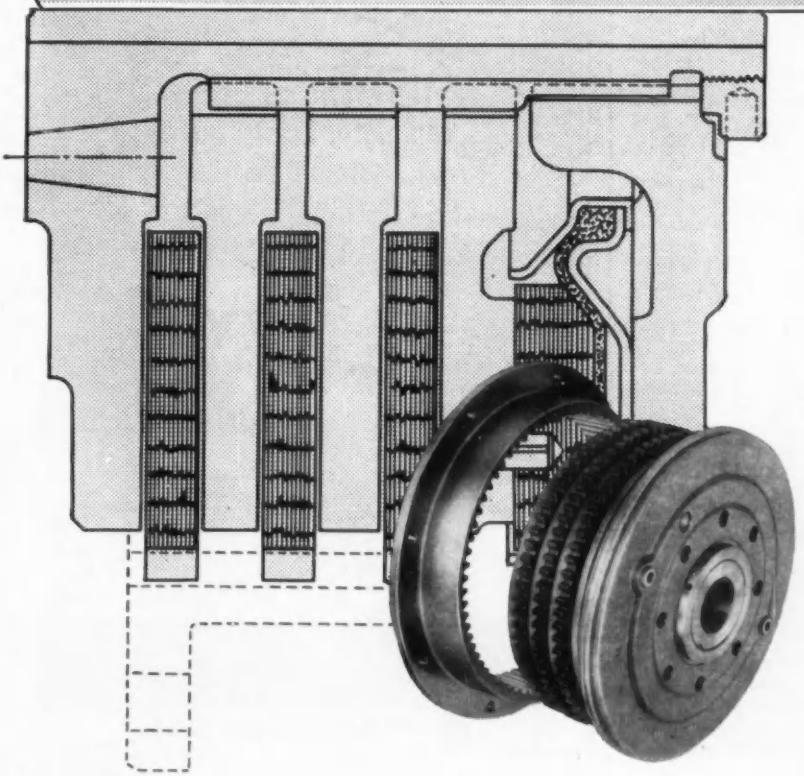
Enclosed find my check money order cash.
Please send me your complete catalog.

Will the greater machine productivity lower the living standards of the worker? Here is the answer —read it now! 248 pages, 413 illustrations, $6.00.



- **New design permits highest capacity at up to 40% less cost than comparable remote controlled air clutches!**
- **Available in sizes 8, 10 and 11½ inches . . . in triple-plate, double-plate and single-plate construction . . . with maximum torque capacity of 3503 pound-feet.**
- **Exclusive cartridge-type diaphragm of long-lasting neoprene reinforced with nylon . . . eliminates leakage and provides long life.**
- **Provides constant torque capacity without adjustment . . . self-compensating for wear.**
- **Compact and rugged . . . with clutch mass properly distributed relative to friction area, providing long life on high energy loads.**
- **Narrow width permits replacement of old-style drum or band clutches.**
- **Suitable for air systems up to 130 pounds per square inch.**

New LOW COST high capacity Twin Disc Air Clutches



The new Twin Disc 8, 10 and 11½-inch PO Air Clutches are adaptable wherever the convenience of remote air control is desired. They are currently in use on rock crushers, tractor winches, pipe-extruding machines, drilling rigs, machine tools, pug mills and other equipment.

The three new sizes extend the time-tested, job-proved line of PO Air Clutches from 8 to 36 inches in diameter . . . in torque capacities to 126,600 pound-feet.

Check your next design . . . see for yourself how PO Air Clutches lend themselves to convenient, economical remote control. Write Twin Disc Clutch Company, Racine, Wisconsin.

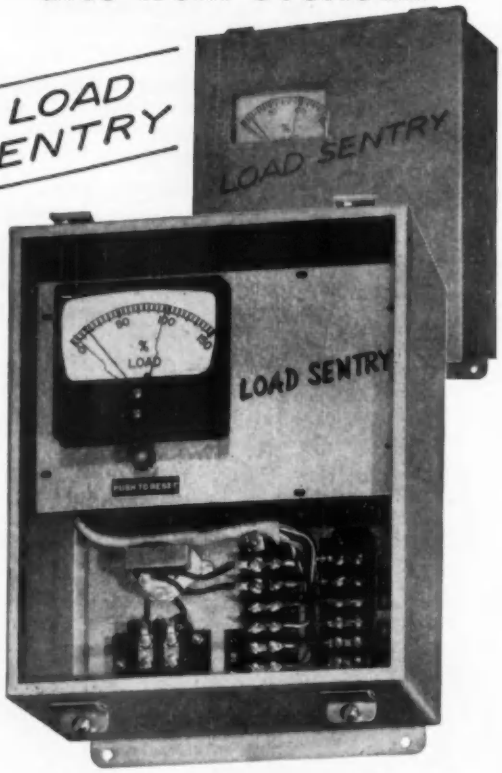
TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC

Friction Clutches and Fluid Drives

Protects motors, tools and dies from overload

LOAD SENTRY



Load Sentry, NEMA 12 Housing, Phase Failure Protection • Price $240.00

With one pointer, you set the load limit anywhere on the dial. Another pointer shows running load on the motor. If an overload occurs, these pointers meet and a protective circuit is energized, or the motor is shut down, as preferred.

EASY TO ORDER: Specify motor full load current; or horsepower, voltage, and phase.

EASY TO INSTALL: Eight easy connections to make—any plant engineer, electrician or maintenance man can do it.

RELIABLE: No electron tubes. "Fail-Safe" circuitry engages protective circuit if component fails.

ACCURATE: Meter-relay "heart" is able to detect two pieces of stock moving through a progressive die; 3% load increase will trigger protective circuit.

SAFE: After overload, an interlock prevents start-up until overload is cleared and reset button is pressed.

FAST: Shutdown or alarm is virtually immediate if overload occurs.

VERSATILE: Adjustable load setting and interchangeable current transformers make LOAD SENTRY usable on any motor. Can be wired to shut down motor, disengage clutch, or give alarm.

UNAFFECTED BY STARTING SURGE: No false shutdown while motor is drawing heavy starting current.

INDICATING: Motor current is continuously shown.

EQUIPPED WITH PHASE FAILURE PROTECTION: A fixed "low limit" alarm pointer gives protection if one phase of a three phase system goes out (optional).

BUILT IN NEMA 12 (standard), WALL CABINET, OR PANELMOUNT HOUSINGS.

Ask for Data Sheet 7

ASSEMBLY PRODUCTS, INC.
75 Wilson Mill Road • Chesterland 80, Ohio
Telephone: (Cleveland, O.) HAmilton 3-4436 and 3-4446

Booth 1020, ISA SHOW, Sept. 9-13, Cleveland Auditorium, Cleveland, O.

G&O Radiators
42nd Year

ENGINE COOLING RADIATORS
•
HEATERS
•
OIL COOLERS
•

THE G & O MANUFACTURING CO.
NEW HAVEN CONNECTICUT

IF YOU USE THESE PRODUCTS

send for the world's most complete, illustrated catalog of

ELECTRIC LANTERNS and **SAFETY CANS**

VALUABLE DATA:
- The world's first comprehensive table of lamp and battery operating information
- High power searchlights
- All-purpose hand lights
- Safety lights and lanterns
- Flammable liquid SAFETY CANS
- Oily Waste Cans



JUSTRITE Mfg. Co.
2061 N. Southport, Chicago, Ill.

CATALOG NUMBER 569-V9

STAMPINGS

Produced economically in our modern plant for:

AUTOMOTIVE, INDUSTRIAL EQUIPMENT, AIRCRAFT, AGRICULTURAL INDUSTRIES AND OTHERS; will boost your output at material savings.

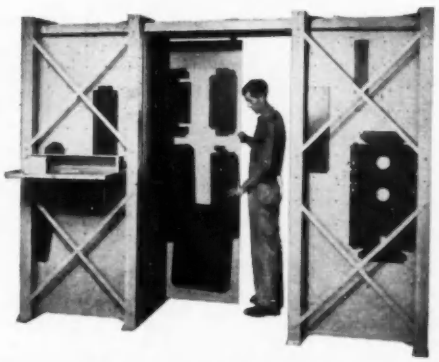
Our production, engineering and tool-room facilities are geared to the volume usage of *your* industry.

Send us your inquiries

LANSING STAMPING COMPANY

1157 So. Penn. Ave.
Lansing 4, Michigan

ESTABLISHED 1914



Nearly 3,000 sq. ft. of steel filing space in 25 sq. ft. of floor space with

DELUXE TEMPLA-FILE

(patent pending)

New practical system for vertical filing and storing of templates, patterns, gaskets, and mock-ups.

- Eliminates wasted man-hours locating patterns
- Saves floor space
- Foldaway reference desk holds handy card index file.
- 24 free-sliding panels—each support 600 lbs.
- One Templa-File user states he saved 75% of the time previously used in locating templates.

Call your Deluxe dealer or write for Bulletin #100

DELUXE

DELUXE METAL FURNITURE CO., Warren, Pa.
A Division of the Royal Metal Mfg. Co.

STRONG

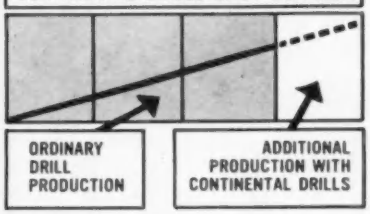
CONTINENTAL Certified DRILLS



MORE HOLES PER DRILL

Today's drilling problems on both standard and new metals require twist drills with *something extra* built into them. That's why Continental drills are so acceptable to leading *cost conscious* production plants. Reduced friction heat and greater chip clearance are only a few of the reasons why Continental drills *last longer*—up to 25% more production. Ask your industrial jobber for the "Continental Story"

MAJOR PRODUCTION PLANTS PROVE CONTINENTAL DRILLS LAST LONGER!





CONTINENTAL DRILL CORPORATION

555 W. Adams St., Chicago 6, Illinois

WAREHOUSES:

NEW YORK	LOS ANGELES	TACOMA, WASH.
50 Church Street	6551 Whittier Blvd.	2006 Center Street
CO 7-5662	RA 3-1287	MA 7-3434

This TRU-LAY PUSH-PULL DATA FILE

for Design Engineers will show you how these flexible remote controls are being used on hundreds of products to—eliminate complex, costly mechanical linkages . . . simplify design and assembly . . . improve appearance, operating characteristics and salability.



Send for this

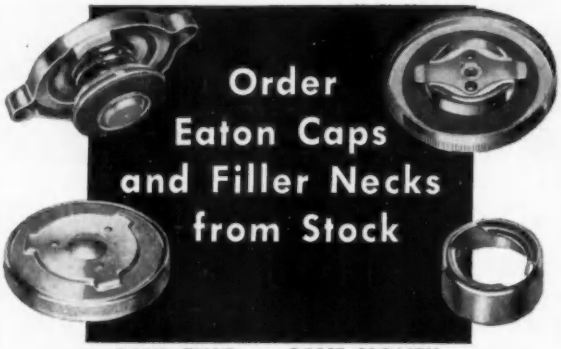
USEFUL DATA FILE ON TRU-LAY *PUSH-PULL*

It contains six engineering bulletins and booklets that will answer all your questions on the adaptability of these versatile and dependable remote controls.

ACCO

AUTOMOTIVE and AIRCRAFT DIVISION
AMERICAN CHAIN & CABLE

601-H Stephenson Bldg., Detroit 2 • 2216-H South Garfield Ave., Los Angeles 22 • 929-H Connecticut Ave., Bridgeport 2, Conn.



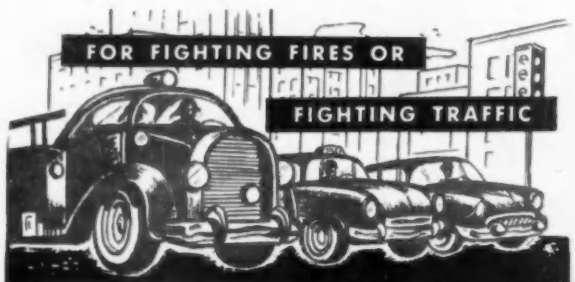
Order Eaton Caps and Filler Necks from Stock

SAVE TIME . . . SAVE MONEY

Eaton offers immediate delivery on caps and filler necks now in production. Available types include fuel tank caps, oil filler caps, radiator caps (both standard and pressurized system types), and suitable closures for sheet metal tanks in every field of service. Enjoy the cost advantages of high volume production, plus the time-saving benefits of purchasing thoroughly tested, well engineered caps and filler necks from stock. Send for illustrated folder with specifications covering Eaton's complete line of standard caps and filler necks.

EATON **Radiator and Fuel Tank Pressure Relief Caps and Valves a Specialty**

EATON MANUFACTURING COMPANY
STAMPING DIVISION • 17877 St. Clair Avenue • Cleveland 10, Ohio



TUTHILL SPRINGS

CARRY THE LOAD BETTER!

Superior quality alloy steel and 76 years of specialized engineering experience are the "priceless ingredients" that make TUTHILL *Leaf and Helper Springs right* for *your* job. Whether you build fire-fighters or taxicabs, dump or excavating equipment, multi-axle jobs, cars, or trailers, consult TUTHILL for the *best spring* for *your* job!



TUTHILL SPRING CO.
760 West Polk Street, Chicago 7, Illinois

DYKEM STEEL BLUE

Stops Losses making Dies and Templates



Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2301L North 11th St. • St. Louis 6, Mo.

CUT SCRAPER TIME

END NIGHT CLEANUP & MORNING REBLUING



DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

THE DYKEM CO., 2301L NORTH 11TH ST., ST. LOUIS 6, MO.

AUTOMOTIVE INDUSTRIES is read by general executives, production men, engineers, purchasing agents and others whose o.k. means orders for those who sell to The World's Largest Manufacturing Industry.

MILLIONS OF MOLDED, EXTRUDED, CUT RUBBER PRODUCTS IN STOCK

NATURAL HYCAR HYPALON

BUTYL SILICONE GR-S

NEOPRENE

Whatever your standard or custom needs, contact:

LAVELLE

Rubber Company

430 N. Wood St., Chicago 22, Ill.
Representatives in Milwaukee, Minneapolis, St. Louis, Detroit and Dallas



Technical Handbook for engineers and purchasing agents NOW AVAILABLE

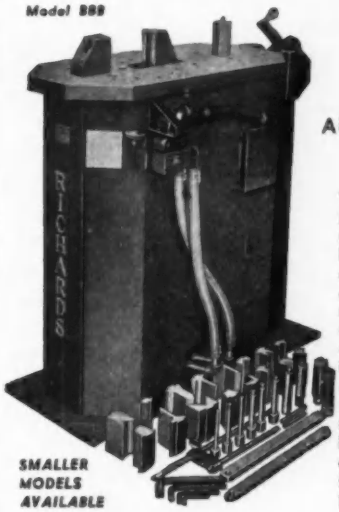
Multiform

BIG BROTHER BENDER



Illustrated above are a few of the many forms that can be produced efficiently on the Multiform Bender.

Model 888



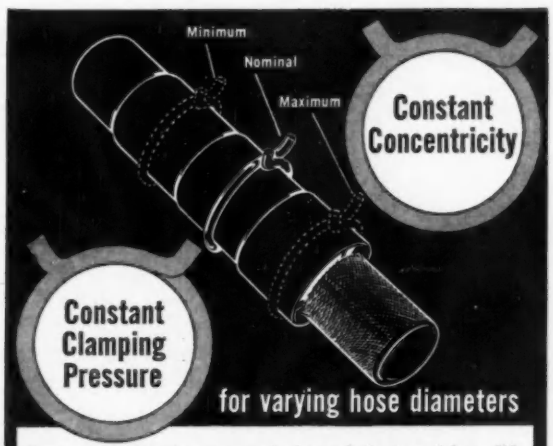
SMALLER MODELS AVAILABLE

AIR OPERATED MODELS IN FOUR SIZES

The heavy duty Big Brother Bender is designed for fabricating bus bars, brackets, fixtures, etc., without special tooling. Air controlled with finger tip response. Comes complete with dies, mandrels and wrenches — punching and blanking dies extra. Will punch holes up to 1" and form material up to ¼" thick by 4" wide. We also build smaller models, hand or air operated, for bending materials up to ⅛" x 1½".

Send for illustrated folder AMI-2

J. A. RICHARDS CO. 903 North Pitcher St. Kalamazoo, Mich.



You can positively prevent leaks and shortened hose life caused by uneven "pinching" of clamps on oversize new hose or service-shrunk connections. Every CORBIN Self-Tightening Hose Clamp now maintains perfect-circle concentricity throughout wide changes in hose diameter! Always provides uniform-clamping pressure at all circumference points.

There's greater variety of CORBIN Hose Clamp sizes, too. Thirty-one sizes from ⅜" to 2⅝" diameter available for immediate shipment. Easy to install with production-line speed. Never need tightening or adjustment. Write for detailed folder and size specification sheet. Corbin Hose Clamp Division, The American Hardware Corporation, New Britain, Connecticut.

The Original Manufacturer of Self-Tightening **HOSE CLAMPS**

CORBIN

THE TREND IN DRAFTING ROOMS THROUGHOUT THE WORLD IS TOWARD IMPERIAL, THE WORLD'S FINEST TRACING CLOTH

Index to

This Advertisers' Index is published as a convenience, care will be taken to index correctly. No allow-

A

Aetna Ball & Roller Bearing Co. .. 21
Ajax Manufacturing Co. 8
Alan Wood Steel Co. 36
Alpha Press & Machine, Inc. 196
Aluminum Co. of Amer....212 thru 214
American Broach & Machine Div. Sundstrand Machine Tool Co. 104-105
American Chain & Cable Co. 242
American Chemical Paint Co. 34
American Drill Bushing Co. 1
American Steel & Wire Div. ...236-237
Assembly Products, Inc. 240
Automatic Spring Coiling Co. 198

B

Baird Machine Co. 116
Baldwin-Lima-Hamilton (Hamilton Div.) 221
Barnes Drill Co. 112-113
Baush-Machine Tool Co. 98
Bendix Aviation Corp. Products Div. 52
Bendix-Westinghouse Automotive Air Brake Co. 25
Bethlehem Steel Co. 45
Binks Mfg. Co. 146
Bliss Co., E. W. 27
Brown Corp. 202
Buffalo Hydraulics Div., Houdaille Industries, Inc. 46
Bullard Company 74

C

Chambersburg Engineering Co. .. 134
Chicago Screw Co. 44
Chilton Book Division 238
Cincinnati Milling Machine Co. 54
Cincinnati Shaper Co. 136
Classified ads 211
Clearing Machine Corp. 124
Colonial Broach & Machine Co. 101-102
Columbia-Geneva Steel Div. ...236-237
Continental-Diamond Fibre Div. 39
Continental Drill Corp. 241
Copperweld Steel Co., Steel Div... 71
Corbin Hose Clamp Div. 243
Cross Company 12-13

D

Danly Machine Specialties, Inc. 135
Davis & Thompson Co. 188
DeLuxe Metal Furniture Co. 241
Detroit Aluminum & Brass Corp.... 234
Detroit Steel Products Div. 24
du Pont de Nemours & Co., (Elastomers) 181
(Polychemicals Dept.) 197
Dykem Co. 242

E

Eaton Mfg. Co., (Stamping Div.) 242
(Valve Div.) 189
Enjay Co. 193
Erie Foundry Co. 113
Evans Products Co. 50
Ex-Cell-O Corp. 117, 119, 121

F

Federal Machine & Welder Co. 233
Federal Products Corp. 160-161
Fellows Gear Shaper Co. 42-43
Fischer & Porter Co. 15
Frauenthal Div. Kaydon Engineering Corp. 48-49
Fuller Mfg. Co. 150

G

G & O Mfg. Co. 240
Gardner-Denver Co. (Keller Tool Div.) 172
Garrett Corp. 209
Garrett Co., Inc., Geo. K. 204
General Electric Co. 22-23, 114-115
Gisholt Machine Co. 110-111
Goodrich Chemical Co., B. F. 246
Greenlee Bros. & Co. 122

H

Hamilton Div. Baldwin-Lima-Hamilton 221
Handy & Harman 166
Hansen Mfg. Co. 208
Hassall, Inc., John 226
Hill Acme Co. 217
Houdaille Industries, Inc., Buffalo Hydraulics Div. 46
Huck Mfg. Co. 224

I

Ingersoll Milling Machine Co., Cutter Div. 120
Inland Mfg. Division 229
International Nickel Co. 2

J

Jones & Laughlin Steel Corp. 51
Justrite Mfg. Co. 240

K

Kearney & Trecker Corp. 210-211
Kelsey-Hayes Co. 32
Kendall Co., (Polyken Sales Div.).. 47
Kent-Owens Machine Co. 31
Keuffel & Esser Co. 216-243
Kingsbury Machine Tool Corp. 103

L

Lansing Stamping Co. 241
LaSalle Steel Co. 41
Lavelle Rubber Co. 243
LeBlond Machine Tool Co., R. K... 72
Lees-Bradner Co. 90
Lindberg Engineering Co..143, 145, 147
Lipe-Rollway Corp. 190

M

McQuay-Norris Mfg. Co. 227
Mahon Co., R. C. 138
Mallory & Co., Inc., P. R. 16
Mechanics Universal Joint Div. 20
Metallurgical Products Dept. 114-115
Michigan Tool Co. 99-100
Modern Industrial Engineering Co. 94
Moline Tool Co. 200

N

National Acme Co. 108-109
National Automatic Tool Co. ..194-195
National Broach & Machine Co. .. 199
National Machine Products Co. 245
National Screw & Mfg. Co. 40
National Tube Div. 236-237
New Departure Div. .....Back Cover
Niagara Machine & Tool Works ..18-19
Norton Company 96-97

O

Olofsson Corp. 203

P

Perfect Circle Corp. 185

Advertisers

and not as part of the advertising contract. Every care will be made for errors or failure to insert.

R

Raybestos-Manhattan, Inc.,
Equipment Sales Div. 201
Plastic Products Div. 14
Richards Co., J. A. 243
Rigidized Metals Corp. 30
Robbins Co., Omer E. 95
Roebling's Sons, Corp., John A. ... 33
Ross Gear & Tool Co. 5
Rotor Tool Co. 4

S

S-P Mfg. Corp. 222
Schwitzer Corp. 179
Sciaky Bros. 205
Sharon Steel Corp. 9
Shuford Mills, Inc. 220
Simmons Fastener Corp. 10
Snyder Tool & Engineering Co. ... 92-93
Southern Screw Co. 215
Standard Oil Co. (Indiana) .2nd Cover
Standard Pressed Steel Co. 6-7
Standard Tube Co. 225
Sterling Aluminum Products, Inc. .. 187
Struthers Wells Corp. 132
Sundstrand Machine Tool Co.,
104 thru 107

T

Tennessee Coal & Iron Div. 236-237
Texas Company 65
Thompson Products, Inc., Michigan
Div. 177
Thor Power Tool Co 118
Timken Roller Bearing Co. 37
Tomkins-Johnson Co. 219
Tuthill Pump Co. 223
Tuthill Spring Co. 242
Twin Disc Clutch Co. 239

U

Udylite Corp. 28
United States Rubber Co.,
(Naugatuck Chemical Div.) 29
United States Steel Corp. 236-237

V

Valvair Corp. 35
Verson Allsteel Press Co. 230-231
Vickers, Inc. 38
Vulcan Tool Co. 192

W

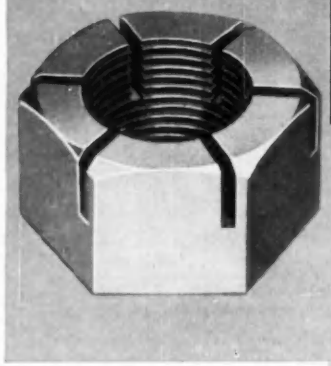
Waldes Kohinoor, Inc. 17
Wean Equipment Corp. 133
Webster Electric Co. 11
Weltronic Company 218
Westinghouse Electric Corp.,
Cypak 91, 191
Weld O Timer 206-207
Wyman-Gordon Company 26

Y

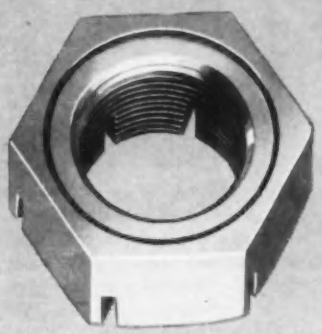
Yoder Company 235
Young Radiator Co. 232

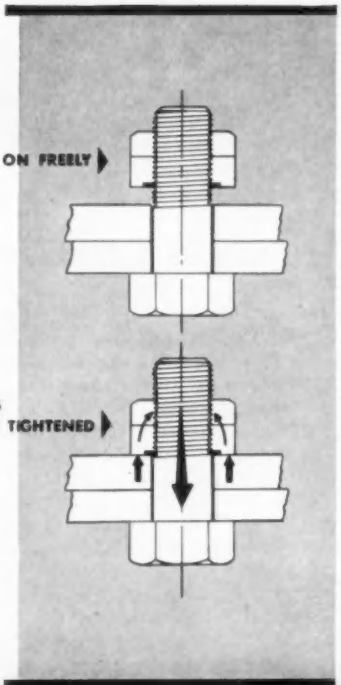
Z

Zollner Corp. .....3rd Cover



the
MARSDEN
free running lock nut





The Marsden action can be incorporated into nuts of any size or material, with standard or special threads—its action relieves the heavy concentration of stress in the lower threads of a conventional nut.

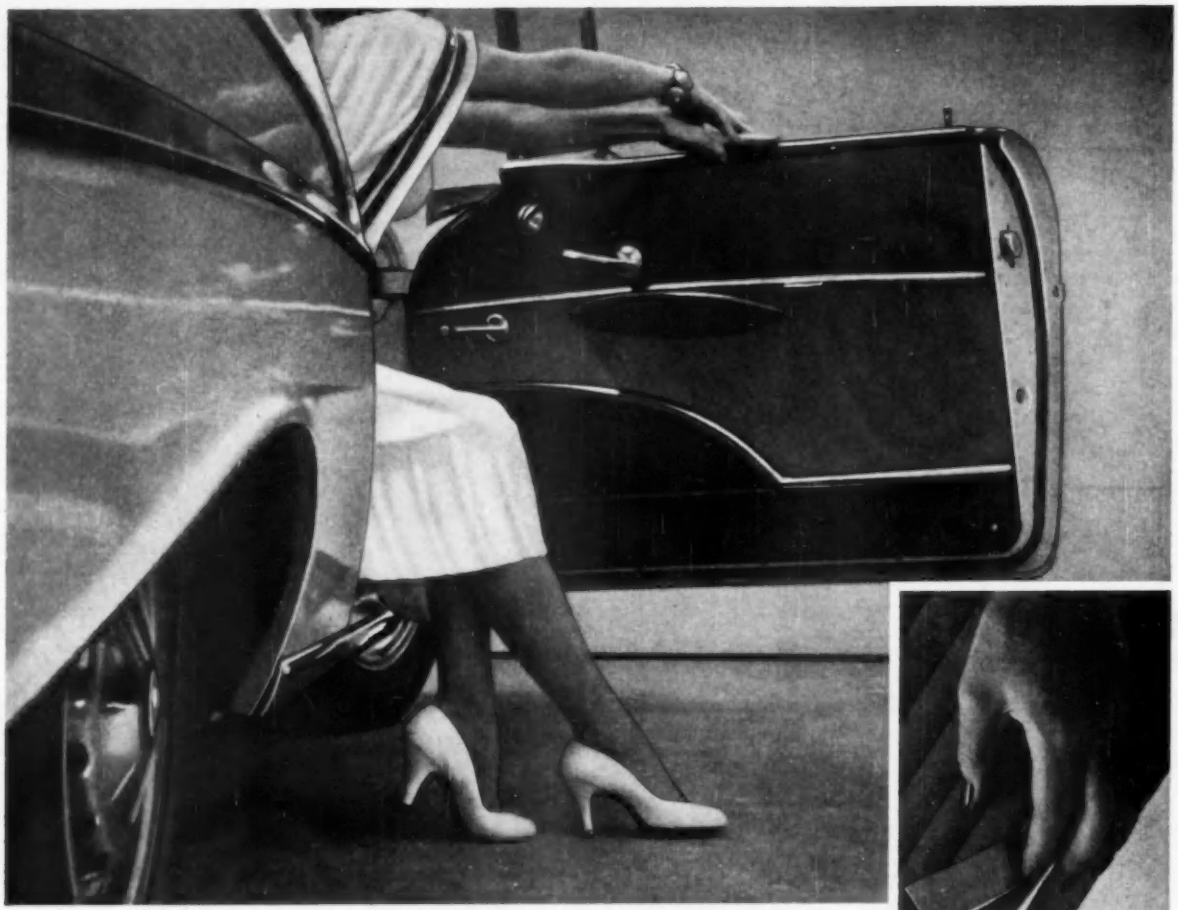
Manufacturer of Standard and Special 12 Pointer and Hexagon Nuts . . . "Huglock" and "Marsden" locknuts.

Complete engineering data, specifications and prices are contained in a twenty-four page Marsden section of our catalog.

NATIONAL MACHINE PRODUCTS COMPANY
UTICA ROAD UTICA, MICHIGAN

Another new development using

B.F.Goodrich Chemical *raw materials*



Geon makes a triple play in this automotive upholstering material. The backing is cardboard coated with Geon latex; padding is economical nonwoven fibers bonded with Geon latex; exterior is fabric coated with Geon. The assembly is heat sealed.

sales clincher...exciting new materials with **GEON**

SHE DOESN'T KNOW the compression ratio, but she knows what she likes in fabrics. And this is it.

Geon polyvinyl materials, coated on fabric, impart the luxurious, colorful look, permit an infinity of surface patterns. Rugged too – waterproof, abrasion-resistant, readily washable.

Versatile Geon gives new cars beauty in upholstery, safety in foam padding, economy in molded air ducts, improved performance in electrical insulation. Geon and sales benefits go together – investigate this remarkable plastic raw material for *your* products.

HOW WE CAN HELP YOU— B.F.Goodrich Chemical, the pioneer in polyvinyl plastics, supplies hundreds of different types of resins, plastics, latices, and polyblends tailored to specific uses. Our Sales Service laboratory can give invaluable help in application. For information write Department FZ-5, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

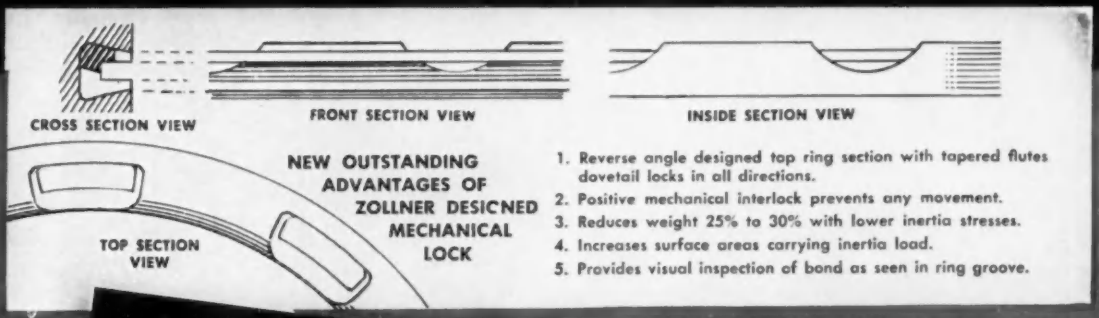


B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich **GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors**

BOND-E-LOC* PISTONS

WITH "NI-RESIST" IRON TOP RING SECTION



1. Reverse angle designed top ring section with tapered flutes dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
4. Increases surface areas carrying inertia load.
5. Provides visual inspection of bond as seen in ring groove.

Double Bonded

METALLURGICALLY Al-Fin Bond

MECHANICALLY Zollner Lock



STOPS!

RING GROOVE WEAR IN HEAVY DUTY SERVICE

"Sensational mileage" is the unanimous report of heavy duty engine builders and transport operators using Zollner "Bond-O-Loc" Pistons. Another great development by Zollner engineers, this super-mileage piston has a "Ni-resist" top ring groove section *permanently* incorporated with the *double* bond of *both* Al-Fin metallurgic *and* the exclusive Zollner mechanical lock. Separation failure is impossible. Ring groove wear problems are eliminated, blow-by prevented, oil consumption minimized, mileage to overhauls greatly increased. We suggest an immediate test of these sensational advantages for your engine.

Licensed under Patents 2,396,730; 2,455,457; 2,550,879

*T. M. Reg. Pat. App. For

ADVANCED ENGINEERING

PRECISION PRODUCTION

COOPERATION with Engine Builders

ZOLLNER PISTONS

THE ORIGINAL EQUIPMENT PISTONS

ZOLLNER

ZOLLNER • Fort Wayne, Indiana

FACTS

about

NEW DEPARTURE BALL BEARINGS



MAST-GUIDE BALL BEARING SIMPLIFIES DESIGN and LOWERS MAINTENANCE COST!

New Departure's mast-guide ball bearings bring lift truck designers greater variation in upright construction. These bearings eliminate sliding metal-to-metal contact and multiple bearings of complex design . . . as well as need for maintenance by the end user.

The mast-guide bearing is integrally sealed and lubricated for life. The heavy-section outer ring gives the added beam strength and shock resistance required for rugged duty. The extra width of the outer ring provides more contact surface to reduce mast brinelling. The hardened and ground "tire" is part of the bearing itself, resulting in lower cost for the lift truck manufacturer.

These bearings give the same advantages common to all New Departure ball bearings—unexcelled long-life performance in handling heavy combined loads . . . lowest operating friction for consequent improvement in horsepower efficiency. Also, there is no need for relubrication or adjustment throughout years of service.

Write for examples in *your* field where New Departure ball bearings and bearing engineering service help make good products better.

Photo: Courtesy of Clark Equipment Co.

BALL BEARINGS MAKE GOOD PRODUCTS BETTER

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.